Office of the Superintendent of Financial Institutions Canada
Bureau du surintendant des institutions financières Canada

Optimal Funding of the Canada Pension Plan

Actuarial Study No. 6

April 2007
Office of the Chief Actuary

OSFI
BSIF

Canada

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I. Executive Summary

A. Purpose

This is the sixth study to be published by the Office of the Chief Actuary (OCA). The primary purpose of this study is to examine the current funding approach of the Canada Pension Plan (CPP or the "Plan") in terms of its optimality compared to other funding approaches.

This study was undertaken on the recommendation of the CPP independent peer review panel. Independent peer reviews of actuarial reports on the CPP are conducted to ensure that the credibility of the information presented in such reports is indisputable. The review panel recommended that the current financing methodology of the CPP be reviewed periodically to confirm that it remains optimal.

For this purpose, the steady-state funding methodology is examined in terms of its continued appropriateness for ensuring the long-term financial sustainability of the Plan. A brief history of the CPP is also discussed to provide an historical perspective of the events and circumstances that led to the development of the current funding methodology. In addition, this study also provides a context for funding of social security schemes by discussing various schemes of other countries and by comparing different ways and objectives of funding such schemes.

B. Main Findings

1. Sensitivity of the Methodology

The steady-state, partial pre-funding methodology was tested by analyzing alternative projected scenarios in comparison to the best-estimate scenario projected in the 21st Actuarial Report on the Canada Pension Plan as at 31 December 2003 ("21st CPP Actuarial Report"). Under the best-estimate scenario of the 21st CPP Report, the average pay-as-you-go (PayGo) rate over the steady-state determination period 2016-2066 is 10.9% and the steady-state contribution rate is 9.8%. The comparative scenario analysis showed that:

- A younger population (and accompanying better economic environment) than projected under the 21st CPP Actuarial Report results in a decrease in the average PayGo rate over the steady-state determination period to 10.5% which, in turn, leads to a decrease in the steady-state rate to 9.3%, whereas an older population (and accompanying worse economic environment) than projected under the 21st CPP Actuarial Report results in an increase in the PayGo rate and thus an increase in the steady-state rate to 11.4% and 10.3%, respectively.

- Under an extreme scenario of a much younger population with economic growth, the PayGo rate and steady-state rate change considerably which significantly improves the projected financial status of the Plan. The average PayGo rate decreases to 7.9% and the steady-state rate decreases to 7.6%, whereas under an extreme scenario of a much older population with economic stagnation, the average PayGo and steady-state rates increase to 15% and 12% respectively, which significantly worsens the projected financial status of the Plan.

- Altering the period over which the steady-state contribution rate is determined shows that stability in the PayGo rate during the period leads to stability in the steady-state rate, while an unstable PayGo rate during the period leads to instability in the steady-state rate.

- The stability of the steady-state contribution rate is directly linked to how the PayGo rate evolves over a given steady-state determination period. Since the PayGo rate may or may not be stable in any given period, the steady-state rate will also vary in accordance. When the determination period begins, the duration of the period, and the demographic and economic conditions during that period are all factors that affect the evolution of the PayGo rate and hence the steady-state rate.

- The difference between the PayGo rate and steady-state rate depends on the projected scenario. Better projected conditions tend to reduce the difference, while worse conditions tend to increase it.

- Using a longer determination period to compute the steady-state rate results in stabilization of the A/E ratio (under the steady-state rate) over a longer period and less change in the ratio afterward.

2. Appropriateness of the Methodology

Social security schemes in different countries are funded in various ways, which are continually reviewed for their level of appropriateness given the respective benefits and risks involved and changing demographic and economic conditions. There are three basic ways of funding such schemes, namely pay-as-you-go, full, and partial funding. PayGo financing is more appropriate in an environment of high real total wage growth and low real investment returns, while full funding is more appropriate in an environment of low wage growth and high investment returns. Partial funding lies between these two approaches and applies well in an environment of declining total wage growth and rising investment returns. To be beneficial, any level of prefunding must lead to an increase in national saving and ultimately in economic output to supply the goods and services consumed by future retirees.

In Canada, the economic and demographic conditions are such that a fuller funding model is more appropriate. Because the working age population is declining, the total wage growth is also declining. This means that CPP contributions from the working population are declining and thus will not be sufficient to maintain the cost of providing benefits to an increasing population of retired workers. On the other hand, investment returns are expected to remain higher than the total wage growth over the projected period. Thus, it makes sense to have a CPP fund that is pre-funded and has sufficient assets that can be invested so that the investment earnings can contribute to covering the costs of benefits.

C. Conclusion

Major changes in 1997 led to the change in financing of the CPP from a PayGo basis to a form of partial funding called steady-state funding. The 1997 reform, and particularly steady-state funding, resulted in the Plan's financial sustainability being restored for current and future generations. The financial status of the Plan is expected to continue improving over time as the assets, asset/expenditure ratio and funding ratio are all projected to increase. The steady-state contribution rate results in asset/expenditure and funding ratios that are both relatively stable over time. The excess of the legislated rate over the steady-state rate that has existed since 2003 has further improved the Plan's financial status and has provided room for the Plan to absorb some of the impact of future adverse experience that may arise. As it is expected that real investment returns will continue to exceed real growth in total earnings and that the legislated rate will be maintained at a level higher than the steady-state rate, the funding level of the Plan is expected to continue increasing over time.

This study shows that the steady-state funding methodology of the CPP is robust and appropriate for the purpose of contributing to the long-term financial sustainability of the Plan, assuming that future demographic and economic conditions do not vary drastically from those projected, that CPP assets continue to earn a reasonable rate of return and the PayGo rate does not exceed the steady-state rate to a large degree. All of these conditions are considered to be reasonable over the long term.

In summary, this study shows that steady-state funding of the CPP is a form of optimal funding of the Plan. Although the funding methodology could always be changed or reworked altogether, the objective of prefunding the Plan should remain paramount. By stabilizing the asset/expenditure and funding ratios over time, the steady-state methodology helps to ensure that the CPP is affordable and sustainable for current and future generations of Canadians. Moreover, steady-state funding of the CPP, which is a form of partial funding, complements the funding approaches of the other components of the Canadian retirement income system, namely the partial funding of the Québec Pension Plan, the PayGo financing of the Old Age Security Program, and the full funding of employer-sponsored pension plans, Registered Retirement Savings Plans and other private savings plans. Collectively, this diversified funding approach of the Canadian retirement income system allows it to adjust better to fluctuations in demographic and economic conditions compared to systems with single funding approaches. This diversification is further enhanced by the mix of public and private pensions of the Canadian system, which is an effective way to provide for retirement income needs according to international organizations.

II. Introduction

A. Purpose

This is the sixth actuarial study to be published by the Office of the Chief Actuary, undertaken on the recommendation of the CPP independent peer review panel.

Independent peer reviews of actuarial reports on the CPP are conducted to ensure that the credibility of the information presented in such reports is indisputable. The review panel recommended that the current financing methodology of the CPP be reviewed periodically to confirm that it remains optimal.

The purpose of this study is to examine the current funding approach of the Canada Pension Plan in terms of its optimality compared to other approaches. In particular, the current steady-state contribution rate funding methodology is analyzed by way of scenario analysis to ascertain its long-term soundness in ensuring the financial sustainability of the Plan.

This study also provides a context for funding of social security schemes by discussing various schemes of other countries and by comparing in general terms the different ways and objectives of funding such schemes. Additionally, a brief history of the CPP is discussed which provides an historical perspective of the events and circumstances that led to the development of the current funding methodology.

B. Scope

The scenario analysis in this study starts from the "best-estimate" scenario of the 21st CPP Actuarial Report. The best-estimate scenario of the 21st CPP Actuarial Report consists of long-term projections and is based on "best-estimate assumptions". These assumptions reflect the best judgement of the Chief Actuary of the CPP as to future demographic and economic conditions that will affect the long-term financial sustainability of the Plan. The different scenario projections in this study cover a 75-year period and provide a measure of the sensitivity of indicators of the financial sustainability of the Plan to different demographic and economic environments.

Section III discusses the different types and objectives of funding of social security schemes. Section IV provides a brief history of the CPP which led to the current funding methodology of the Plan. A detailed description of the steady-state funding methodology is next provided in section V. This is followed by scenario analysis in section VI to test the sensitivity of the steady-state funding methodology together with other long-term financial indicators of the Plan. Section VII provides overall advantages and disadvantages of the funding mechanism for the CPP. The conclusion follows in section VIII. Lastly, four appendices follow in section IX. Appendix A provides the principles upon which changes made in 1997 to the Plan (the "1997 reform") were based. Appendix B discusses the social security schemes of several countries and their respective funding methods. Appendix C lists the references used, and Appendix D lists the references used and contributors to this study.

III. Funding of a Social Security Scheme

There are three basic ways to fund a social security scheme - from pure pay-as-you-go, to partial funding, to full funding. The funding method chosen will depend on the given objectives of the scheme. Funding objectives may include stabilizing and/or minimizing the contribution rate, and stabilizing the funding level in accordance with funding rules specified in legislation. The preservation of benefits provided by a scheme, though an important objective, is not the sole one considered in maintaining its long-term financial sustainability.

Many demographic and economic factors influence a pension scheme and its cash flows. Inflows to a plan come from contributions and investment income. Contributions are affected by both the growth in the workforce and in wages, which in turn are affected by inflation. Investment income is affected by the evolution of interest rates and the capital markets, which are also affected by inflation. Outflows from a plan are comprised of benefits paid and administrative costs. Benefits are affected by wage growth (for an earnings-related plan) and inflation, while administrative costs also rise with inflation. The difference between total inflows and outflows constitutes the plan's reserve.

The contribution rate for a social security scheme will be affected by demographic and economic factors, and so will be subject to variation over time. Defined benefit schemes are particularly subject to fluctuating rates. Although the contribution rate is subject to change, a stable rate is generally considered desirable for several reasons. First, a stable contribution rate reinforces the link between contributions and benefits. A stable rate also distributes costs more equally across generations, especially in the context of an aging population. In addition, modifying the contribution rate to recognize the long-term implications of plan amendments promotes fiscal discipline and governance. Lastly, maintaining a stable contribution rate promotes greater confidence by the public in the scheme.

The method of funding a social security scheme will involve risks to varying degrees. For instance, political risk may arise from a fund managed by or on behalf of the government if funds are invested in less than an optimal way for the benefit of the public or if funds are not kept separate from revenues accessible by the government. In the case of a mixed system including individual accounts where workers are given the choice of which funds to invest in, inadequate education of the public, lack of any smart default option, and inadequate regulation and supervision of the investment managers may result in poor investment choices, high transaction costs, and thus lower than expected net returns. In addition, any level of prefunding exposes a scheme to investment risk. However, good plan governance together with accountability and transparency act to mitigate these risks.

Despite the risks involved, there may be social and economic benefits to prefunding a scheme. Prefunding a social security scheme will not stop the tide of population aging; however, it may lead to enhanced benefit security and the alleviation of poverty in old age. More generally, prefunding may enhance growth in and development of the economy through the development of the infrastructure of the country, especially its financial markets. The measure of the benefit of prefunding a scheme is whether advance funding does indeed lead to an increase in national saving. Further, this increase must in turn lead

to an increase in labour force productivity to increase total output or wealth in the economy, the reason being that retirees in any given year can only consume the goods and services produced by workers in that year or in the period immediately prior to that year. As such, a scheme should take into account the impact of its provisions, most notably those influencing the labour market, on future economic output and incorporate means to contribute to its growth.

Each funding method has different objectives as well as both advantages and disadvantages. The following sections describe in detail these different methods, their objectives, and their relative benefits and drawbacks.

A. Pay-As-You-Go Funding

Under a PayGo funding scheme, the contributions of a given year arising from the working generation are used to pay the benefits in the same year to the previous generation of retirees. Under such a scheme, there is no fund except possibly for a small reserve to meet the immediate liquidity requirements of benefit payments in any given year. The PayGo contribution rate is the ratio of total scheme expenditures to the total insured or contributory earnings.

A scheme's expenditures will be determined by the growth in benefits and will tend to increase in the years following the inception of the scheme as more contributors reach retirement age and as retirees become eligible for larger benefits as contributory periods increase in duration. As this occurs, the PayGo rate will tend to increase. The PayGo rate will also tend to rise in the face of an aging population. On the other hand, growth in the workforce and higher rates of earnings growth tend to decrease the PayGo rate. Over time, as the scheme matures, gradual variations in the rate will occur; however, the PayGo rate will stabilize if the population age structure stabilizes.

It is more appropriate to fund a scheme on a PayGo basis in an environment of high wage growth and low investment returns. In such an environment, total growth in earnings provides for a strong contribution base to meet expenditures in a given year, and this in turn reduces or eliminates the need to rely on the accumulation of a fund from relatively small investment gains to meet those expenditures.

As OECD countries have been subject to the aging of their populations, slowing growth in their workforces and volatility in wage growth and interest rates, PayGo schemes have come under increasing pressure to absorb and manage the impacts. Given the volatile demographic and economic environments, the importance of a degree of funding has become evident. Partial funding is discussed further in section C below. This differs from fully funding a scheme, which is discussed next.

B. Full Funding

Under a fully funded scheme, total contributions paid by workers during their working lives are used to pay for their own benefits; in other words, each generation funds its own benefits. For a fully funded scheme, the contribution rate at a given point in time is estimated based on the discounted value of future benefits.

Employer-sponsored defined benefit plans in Canada are required to be fully funded in order to protect the benefits promised to employees in case of employer insolvency. The financial status of these plans is assessed by means of an actuarial valuation at a minimum triennially. The actuarial valuation of a plan reveals the plan's funded position, its contribution requirements and its membership characteristics. The valuations take into account future service accruals, expected outcomes versus actual experience and any past unfunded liabilities in determining the contribution rate, and these periodic adjustments results in short-term variations in the rate. The valuations are performed on both a going-concern (i.e. ongoing) and solvency (i.e. termination) basis. In the case unfunded liabilities result from either valuation, special contributions may be required to amortize the unfunded liabilities within a certain period of time. Further, an unfunded solvency liability may require subsequent valuations on an annual basis.

Social security schemes that provide earnings-related defined benefits are not generally fully funded since the plan sponsor is the government and as such, insolvency is not considered to be of any material concern as the government has the discretion to modify the contribution rate and/or the level of benefits. Similarly, social security schemes are financed on an ongoing rather than a termination basis as set out in government legislation that reflects the long-term nature of the schemes. It should be noted, however, that a national retirement income security system may have other components that are fully funded.

It is more appropriate to fully fund a social security scheme in an environment of low wage growth and high investment returns, in contrast to a scheme financed on a PayGo basis. In such an environment, revenue generated from investment earnings helps to reduce the need to raise the contribution rate in the future. Fully funded schemes are thus dependent on investment earnings to meet current and projected benefit costs. In comparison to a PayGo scheme, mature fully funded schemes are less affected by the age structure of the population since each generation pays for its own benefits.

C. Partial Funding

Under a partially funded scheme, contributions by workers cover a portion of their future benefits. Contributions to the scheme and any investment earnings thereon act to partially fund the scheme. The ratios of assets to liabilities (i.e. the funding ratios) of such schemes are by definition less than one.

It may be appropriate to partially fund a scheme, especially in an environment of declining total wage growth and rising investment returns. Given the aging of the population and the volatile nature of wage growth and investment returns over the long term, a partial degree of funding acts to partially immunize the plan from future increases in the contribution rate. Compared to pay-as-you-go or full funding, a certain level of funding, either achieved directly through a single partial funding approach for the scheme or more broadly through a mix of PayGo and full funding, provides a greater measure of security against volatile contribution rates. Partial funding may be used in response to changing demographics, or toward both stabilizing and minimizing

the contribution rate over the long term such that the rate will eventually fall below the PayGo rate as the scheme matures.

The Canada Pension Plan is a partially funded social security scheme that is part of the broader Canadian retirement income system. This system also includes the Old Age Security Program, the Québec Pension Plan, and employer-sponsored and private savings plans such as Registered Retirement Savings Plans. The Old Age Security Program is financed out of general revenues on a PayGo basis. The Québec Pension Plan is similar to the CPP and is likewise partially funded. Lastly, employer-sponsored and private savings plans are fully funded. The CPP is thus a part of the diversified funding approach of the Canadian retirement income system. This diversified funding approach allows the system to be less vulnerable to fluctuations in demographic and economic conditions compared to retirement systems in other countries that use a single funding approach. In addition, the Canadian approach based on a mix of public and private pensions is an effective way to provide for retirement income needs, according to international organizations.

IV. History of the Financing of the Canada Pension Plan

A. Inception to Pre-1997 CPP Reform

The Canada Pension Plan came into effect 1 January 1966 as an earnings-related plan to provide working Canadians with retirement, disability, death, survivor and children benefits. The Plan was established primarily to assist with income replacement upon retirement. Retirement benefits under the Plan are meant to replace approximately 25% of a beneficiary's pre-retirement earnings.

The Plan covers employees and self-employed persons between the ages of 18 and 70, other than those with earnings less than the Year's Basic Exemption (YBE), members of certain religious groups, persons who qualify under excepted employment, and those covered by the Québec Pension Plan (QPP). The QPP came into effect on the same date as the CPP, and the two plans are very similar.

Contributions to the Plan are based on contributory earnings between the YBE and the Year's Maximum Pensionable Earnings (YMPE). In 2007, the YBE and YMPE are $3,500 and $43,700, respectively, giving a maximum contributory earnings base of $40,200. The legislated contribution rate is shared equally between an employer and employee, or applied fully to self-employed persons. In 2007, the combined employer-employee contribution rate is 9.9% (4.95% each), giving a maximum contribution of $3,979.80 ($1,989.90 each). The YBE has been fixed at $3,500 since 1997, whereas the YMPE increases each year in line with the percentage increase, as at 30 June of the preceding year, in the 12-month average of the Industrial Aggregate (the measure of average weekly earnings by Statistics Canada). The CPP is progressive in that contributions are based on earnings above the YBE so that lower-income earners pay a lower level of contributions for the same effective benefit protection.

The CPP was initially established as a pay-as-you-go plan with a small reserve and an initial combined employer-employee contribution rate of 3.6%. The CPP (and QPP) became the second tier of the Canada's retirement income system, with the first tier being the Old Age Security program (and later Guaranteed Income Supplement and Allowance) financed from general tax revenues and the third tier comprising fully funded employer-sponsored registered retirement plans and individual registered retirement savings plans. A registered retirement plan is one that is registered with the federal Canada Revenue Agency and so qualifies for sheltering and deferral of taxes on contributions made to the plan and investment earnings thereon.

At the time of the Plan's inception, demographic and economic conditions were characterized by a younger population (higher fertility rates and lower life expectancies), rapid growth in wages and labour force participation, and low rates of return on investments. These conditions made prefunding of the scheme unattractive and a PayGo scheme more appropriate. Growth in total earnings of the workforce and thus contributions were sufficient to cover growing expenditures without large increases in the contribution rate being required. Assets of the Plan were invested primarily in long-term non-marketable securities of the provincial governments at lower than market rates, thus providing the provinces with a relatively cheaper source of capital to develop needed infrastructure. However, changing conditions over time,

including lower birth rates, increased life expectancies and higher market returns led to increasing costs to the Plan and made fuller funding more attractive and appropriate. By the mid-1980s, the net cash flow (contributions less expenditures) had turned negative and part of the Plan's investment earnings were required to meet the shortfall. The shortfall continued to grow, which eventually caused the assets to start to fall by the mid-1990s. The fall in the level of assets in turn led to a portion of the reserve being required to cover expenditures.

In the December 1993 (15th) Actuarial Report on the CPP, the Chief Actuary projected that the PayGo contribution rate (expenditures as a percentage of contributory earnings) would increase to 14.2% by 2030. It was further projected that if changes were not made to the Plan, the reserve fund would be exhausted by 2015. The Chief Actuary identified four factors responsible for the increasing costs of the Plan, namely: lower birth and higher life expectancies than expected, lower productivity, benefit enrichments, and increased numbers of Canadians claiming disability benefits for longer periods.

The projected increasing financial burden on workers to financially maintain the Plan led to the federal and provincial governments' decision to consult with Canadians in a review of the Plan and to restore its long-term financial sustainability. Following cross-country consultations held in 1996, the federal and provincial governments agreed to amend the Plan based on nine guiding principles (see Appendix A).

The historical financial status of the CPP from its inception to year 2003 is shown in Table 1. The decrease in assets in the mid-1990s is observed in the table. The subsequent increase in the assets starting in the year 1998 resulted from major changes made to the Plan in 1997, which are discussed in the following section.

Table 1 Historical Financial Status*
($ million)

Year	PayGo Rate**	Contribution Rate	Contributions	Expenditures	Net Cash Flow	Investment Earnings	Assets at 31 Dec.	Yield	Asset/ Expenditure Ratio
	(%)	(%)						(%)	
1966	0.05	3.6	531	8	523	5	525	0.7	52.47
1967	0.06	3.6	623	10	614	37	1,175	4.3	48.98
1968	0.14	3.6	686	24	662	79	1,916	5.2	35.49
1969	0.29	3.6	737	54	683	128	2,727	5.6	28.12
1970	0.49	3.6	773	97	676	193	3,596	6.2	24.14
1971	0.69	3.6	816	149	666	260	4,523	6.6	21.33
1972	0.90	3.6	869	212	657	333	5,513	6.8	19.83
1973	1.08	3.6	939	278	661	406	6,578	6.9	16.78
1974	1.24	3.6	1,203	392	812	497	7,887	7.1	14.06
1975	1.50	3.6	1,426	561	865	608	9,359	7.3	11.47
1976	1.90	3.6	1,630	816	815	746	10,920	7.6	10.48
1977	2.17	3.6	1,828	1,042	786	889	12,596	7.8	9.72
1978	2.38	3.6	2,022	1,296	727	1,043	14,365	8.0	9.03
1979	2.54	3.6	2,317	1,590	727	1,235	16,328	8.3	8.31
1980	2.79	3.6	2,604	1,965	638	1,467	18,433	8.8	7.64
1981	2.94	3.6	3,008	2,413	595	1,785	20,812	9.5	7.03
1982	3.30	3.6	3,665	2,958	707	2,160	23,679	10.1	6.58
1983	3.70	3.6	3,474	3,598	(124)	2,494	26,049	10.5	6.22
1984	3.87	3.6	4,118	4,185	(67)	2,829	28,811	10.8	5.97
1985	4.02	3.6	4,032	4,826	(795)	3,114	31,130	10.9	5.66
1986	4.16	3.6	4,721	5,503	(782)	3,395	33,743	11.0	4.73
1987	5.08	3.8	5,393	7,130	(1,736)	3,653	35,660	11.0	4.31
1988	5.49	4.0	6,113	8,272	(2,159)	3,885	37,387	11.2	3.98
1989	5.76	4.2	6,694	9,391	(2,698)	4,162	38,852	11.5	3.72
1990	6.08	4.4	7,889	10,438	(2,549)	4,387	40,689	11.6	3.53
1991	6.54	4.6	8,396	11,518	(3,122)	4,476	42,043	11.3	3.22
1992	7.23	4.8	8,883	13,076	(4,193)	4,498	42,347	11.1	2.97
1993	7.72	5.0	9,166	14,273	(5,106)	4,479	41,720	11.1	2.72
1994	8.02	5.2	9,585	15,362	(5,778)	4,404	40,346	11.2	2.52
1995	8.09	5.4	10,911	15,986	(5,075)	4,411	39,683	11.5	2.37
1996	8.28	5.6	10,757	16,723	(5,966)	4,178	37,894	11.2	2.15
1997	8.30	6.0	12,165	17,570	(5,405)	3,971	36,460	11.1	1.97
1998	8.19	6.4	14,473	18,338	(3,865)	3,938	36,535	11.2	1.94
1999	8.05	7.0	16,052	18,877	(2,825)	3,845	37,554	10.7	1.91
2000	8.01	7.8	19,977	19,683	294	3,747	41,595	9.7	2.02
2001* **	7.85	8.6	22,469	20,515	1,954	2,628	48,272	5.7	2.23
2002* **	8.16	9.4	24,955	21,666	3,289	227	51,788	0.5	2.28
2003* **	8.19	9.9	27,454	22,716	4,738	7,502	64,028	13.6	2.68

* Table 1 corresponds to Table 10 in the 21st CPP Actuarial Report.

** The pay-as-you-go rates have been calculated using the historical contributory earnings while the contributions are based on an estimate made by the Department of Finance.

*** Results for years 1966 to 2000 are on a cash basis, while results for years 2001 to 2003 are presented on a cost accrual basis with CPP Investment Board assets valued at market. If assets were shown at market value at the end of 2003, total assets would be $67,614 million instead of $64,028 million.

B. 1997 CPP Reform

Overview – Restoring the Financial Sustainability of the Plan

The changes to restore the financial sustainability of the CPP were legislated in 1997 and became effective 1 January 1998. The changes involved a balanced approach to sustain the Plan while ensuring fairness for future generations and between men and women. The 1997 changes were based on the principle of increasing the level of funding in order to stabilize the contribution rate, restore intergenerational equity and secure the financial status of the Plan over the long term. Key changes included steep increases in the contribution rate combined with a freeze on the YBE, a slowing of the future growth of benefits, full funding of any future new or improved benefits, and the modification of the investment policy through the creation of the Canada Pension Plan Investment Board (CPPIB). A major change was the change in the funding scheme from a PayGo basis to a hybrid of PayGo financing and full funding, called "steady-state funding".

Strengthened Stewardship and Accountability

The 1997 reform also strengthened stewardship and accountability to Canadians. Specifically, the statutory periodic reviews of the Plan by the federal and provincial finance ministers were increased from once every five years to every three years. Moreover, if a triennial review reveals that major changes are required to be made to the Plan, Canadians are to be consulted before any such changes are made. The full funding of new or improved benefits in the future was also introduced to account properly for such improvements. In addition, self-sustaining provisions were put in place to safeguard the Plan in the event that the steady-state contribution rate exceeds the legislated contribution rate and no recommendation is made by the Minister of Finance either to increase the legislated rate or maintain it. The steady-state rate is the lowest rate sufficient to sustain the Plan without recourse to further rate increases and is determined by the Chief Actuary. Lastly, reporting to Canadians on the status of the Plan was improved by way of pension accrual statements, regular financial reporting and public meetings by the CPPIB, and enhanced annual reports on the Plan tabled in Parliament.

Further to the changes of 1997, the federal and provincial finance ministers took additional steps in 1999 to strengthen the transparency and accountability of actuarial reporting on the CPP. They endorsed regular independent peer reviews of such reports and consultations by the Chief Actuary with experts on the assumptions to be used in actuarial reports. The most recent independent review of the statutory actuarial report on the CPP confirmed that the work of the Chief Actuary meets professional standards of actuarial practice and is of sound quality. To ensure the quality of future actuarial reports, the Chief Actuary continues to consult with experts in the fields of long-term demographic and economic projections in the preparation of actuarial reports.

Fuller Funding and Changes to Benefits

The schedule of contributions rates since the changes were implemented is shown in Table 2. The results of the 21st CPP Actuarial Report confirm that the contribution rate of 9.9% for years 2004 and thereafter is sufficient to maintain the long-term financial sustainability of the Plan. The combination of a freeze on the YBE at $3,500 and the continued increase in the YMPE had led to the contributory earnings base, and thus the contributions and revenues to the Plan, increasing each year.

Table 2 Schedule of CPP Contribution Rates

Year	Contribution Rate (%)
1997	6.00
1998	6.40
1999	7.00
2000	7.80
2001	8.60
2002	9.40
2003+	9.90

Prior to the changes, retirement, survivor and disability benefits were based on a formula which indexed wages earned over a working lifetime using a final three-year average of the YMPE. This formula was changed to a five-year average which is the most common way of calculating pension benefits in private pension plans. There were also other changes which resulted in reducing the future growth of benefits by about 10%.

The major change of the Plan, specifically financing the Plan using the steady-state funding approach, is discussed in detail in section V.

Full Funding of New or Improved Benefits

One of the changes included full funding of any future new or improved benefits provided under the Plan. As described in Section 113.1(4)(d) of the *Canada Pension Plan*, the federal and provincial finance ministers shall consider the full funding of any new or improved benefits in the form of temporary and permanent contribution rate increases to cover the additional costs. Policy makers intent in introducing this provision in the legislation was likely an attempt to ensure fairness among generations with respect to contributions and benefits.

The operationalization of Section 113.1(4)(d) will come into force following Royal Assent of Bill C-36, an *Act to amend the Canada Pension Plan and the Old Age Security Act*, and once the formal consent of two-thirds of the provinces with two-thirds of the population is obtained. At the time this report was prepared, Bill C-36 was before the Senate. The operationalization of Section 113.1(4)(d) in Bill C-36 provides that any new or improved benefits are to be financed separately from the funding of the

basic Plan and provides regulation-making authority to set out the calculation of the incremental full funding contribution rate. The dual financing of the Plan was put in place -to keep track of the funding of past and current liabilities arising from new or improved benefits separately from the funding of the basic Plan. Bill C-36 states that the Chief Actuary is required to calculate and report on the steady-state contribution rate for the basic Plan, the incremental rate for any new or improved benefits, and the sum of these two rates. The Regulations pertaining to the Bill state that full funding of new or improved benefits is to be considered by the federal and provincial finance ministers upon the advice of the Chief Actuary based on the Chief Actuary's determination of the incremental rate. The operationalization of Section 113.1(4)(d) was required for an improvement to contributory period eligibility requirements for CPP disability benefits, which was also provided in the Bill.

New Investment Policy

It was determined by the review of the CPP in 1996 that to ensure the sustainability of the Plan, higher rates of return would be required than had been realized previously. Continuing to invest solely in short-term and low risk fixed income instruments was not considered to be an option, since it would ultimately require a higher contribution rate. Hence, the CPP Investment Board was created to invest the assets of the Plan in a diversified portfolio with the aim of achieving higher returns without undue risk of loss. All CPP assets will be transferred to the CPPIB by April 2007. The role of the CPPIB will become increasingly important as assets are expected to grow rapidly over the next 15 years with contributions to the Plan projected to exceed expenditures over this period. After 2021, investment earnings will be required to meet expenditures.

In summary, the 1997 reform resulted in the financial sustainability of the Plan being restored and maintained as confirmed in subsequent actuarial reports. The measures implemented ensured strengthened stewardship, accountability and transparency regarding the Plan and its finances.

V. Steady-State Funding of the CPP

Steady-state funding involves a steady-state contribution rate which is the lowest rate sufficient to ensure the long-term financial sustainability of the Plan without recourse to further rate increases. This rate is calculated by the Chief Actuary based on regulations set out in legislation and is part of each triennial actuarial valuation of the Plan that is made public. The steady-state contribution rate ensures the stabilization of the A/E ratio over time. Specifically, Regulations of the *Canada Pension Plan* require that the steady-state contribution rate be the lowest rate such that the A/E ratios in the tenth and sixtieth year following the third year of the most recent review period are the same. With the coming into force of Bill C-36 and the changes that will be in effect, the Plan will be financed on a dual basis. As such, the steady-state rate is determined independently of any incremental rate required to fully fund new or improved benefits; that is, the steady-state rate applies to the basic Plan only, whereas the incremental rate applies to new or improved benefits.

At the time of the 1997 reform, the steady-state contribution rate was determined to be 9.9% for the years 2003 and thereafter as shown in the September 1997 (16th) Actuarial Report on the CPP. The contribution rate was thus scheduled to increase incrementally from 5.6% in 1996 to 9.9% in 2003 and to remain at that level thereafter. In all subsequent actuarial reports on the Plan, the steady-state contribution rate has been determined to be 9.8%. As this rate has been 0.1 percentage points lower than the legislated rate of 9.9% since 2003, the funded status of the Plan has increased more quickly than originally anticipated.

The self-sustaining provisions of the Plan were amended in accordance with Bill C-36 to account for any excess of the steady-state rate over the legislated rate less the incremental rate required to fully fund any new or improved benefits. In the event an actuarial valuation reveals that the steady-state contribution rate exceeds the legislated rate less the incremental rate required to fully fund any new or improved benefits in accordance with Section 113.1(4)(d) of the *Canada Pension Plan*, and further, that no recommendation is made by the Minister of Finance to increase the legislated rate or maintain it, self-sustaining provisions of the *Canada Pension Plan* take effect as a means to safeguard the Plan until the next triennial review occurs. The following table provides examples of the application of the self-sustaining provisions. In each example, the minimal cost is the same at 10.0%; however, the contribution rate varies depending on how the minimal cost is distributed between the steady-state and incremental rates.

Table 3 Application of the Self-Sustaining Provisions

Scenario	Minimal Cost	Steady-State Rate	Incremental Rate	Contribution Rate	Benefits Frozen?
1	10.00%	10.00%	0%	9.95%	yes
2	10.00%	9.96%	0.04%	9.97%	yes
3	10.00%	9.90%	0.10%	10.00%	no

In Scenario 1, the steady-state rate is assumed to increase to 10.0% and the incremental rate is 0%. Thus, the contribution rate would increase to 9.95%, which is the sum of 9.9% and half of the excess of the steady-state rate over 9.9% (i.e. 0.05%). In addition, benefits would be frozen for three years since the steady-state rate is greater than 9.9%

In Scenario 2, the steady-state rate is assumed to increase to 9.96% with an incremental rate of 0.04%. In this case, the steady-state rate is greater than both 9.9% and the difference between the legislated rate of 9.9% and the incremental rate of 0.04% (i.e. 9.86%). Thus, the contribution rate would increase to 9.97%, which is the sum of 9.9%, half of the excess of the steady-state rate over 9.9% and the full incremental rate. In addition, benefits would be frozen for three years since the steady-state rate is greater than 9.9%.

In Scenario 3, the steady-state rate is assumed to remain at the current rate of 9.9%; however, the incremental rate is assumed to increase to 0.10%. In this case since the steady-state rate is not greater than 9.9%, the contribution rate would increase to the sum of the steady-state and incremental rates. Thus, the total contribution rate would increase to 10.0%. Benefits would not be frozen in this case since the steady-state rate is not greater than 9.9%.

In Scenarios 1 and 2 where the steady-state rate exceeds 9.9%, the contributors and beneficiaries both support the additional cost shown in the actuarial report. The degree of cost sharing between contributors and beneficiaries depends on the magnitude of the increase in the steady-state rate; namely, the greater the increase, the greater the proportion of the costs that is borne by contributors.

If the self-sustaining provisions apply, the rate of increase in the contribution rate is dependent on the magnitude of the increase. In addition, the self-sustaining provisions may apply regardless of whether Section 113.1(4)(d) applies, that is, whether the incremental rate is greater than zero or not. In the event the incremental rate is zero, the provisions reduce to a simplified form in terms of the steady-state and legislated rates only.

The financial sustainability of the Plan is achieved if the actual (legislated) rate is greater than or equal to the steady-state rate. In this case, the difference could be viewed as a margin against long-term demographic and economic risks. The legislated rate must reflect both the current and projected demographic and economic environments. Under a given legislated rate, the financial status of the Plan will move toward either PayGo or fuller funding over time as the funding level changes. As actual experience unfolds as either better or worse than expected and the steady-state rate is reevaluated, the legislated rate and the Plan provisions need to be reassessed in terms of the desired funding objective, whether it is to stabilize the contribution rate, stabilize the funding ratio, or some other objective. The steady-state contribution rate results in a funding ratio over the long term that is relatively stable.

Steady-state funding is a partially funded approach and is a compromise between PayGo and full funding, where the level of prefunding depends on the best-estimate assumptions. Maintaining the PayGo approach would have resulted in significant increases in the contribution rate over time to provide the same benefits. On the other hand, moving to a

full-funding approach would have also created unfairness across generations, as some generations would have been required to pay higher contributions than others to cover both their own benefits and the past unfunded liability of current retirees. A partially funded approach provides a balance between PayGo and full funding and also contributes to diversifying the funding of Canada's retirement income system. This diversification in funding strengthens the system against possible fluctuations in economic and demographic conditions.

As a result of the significant increase in the legislated contribution rate over a short period of time and the investment by the CPPIB of the excess cash flows not immediately required to pay benefits, the assets are projected to increase from about two years of expenditures in 1997 to about five years of expenditures by 2015. Prior to the changes, the asset/expenditure ratio was steadily decreasing as both the contribution rate and investments of the reserve were insufficient to sustain the Plan without considerable increases in the contribution rate. The reserve was primarily invested in non-marketable provincial bonds. The change that effected investment of the assets by the CPPIB in capital markets provided a better diversified portfolio and thus a higher expected return on the assets. As a result, the reserve has increased which will help pay benefits for future generations. Moreover, the total assets of the Plan are projected to grow rapidly over the near-term, and this will cause the asset/expenditure ratio and the reserve to further increase over time.

The projected financial status of the CPP using the legislated contribution rate of 9.9% for years 2004 and thereafter is shown in Table 4, while the projected financial status using the steady-state contribution rate of 9.8% is presented in Table 5. For the purpose of the 21st CPP Actuarial Report, the steady-state contribution rate was calculated so as to obtain the same asset/expenditure ratio in the years 2016 and 2066.

The funding ratio of the Plan (i.e. the ratio of assets/liabilities) has been increasing since the changes were implemented. Contributions are projected to exceed expenditures until 2021 at which time a portion of investment earnings will be required to fund the difference. The evolution of the funding ratio under the legislated and steady-state contribution rates is seen in Chart 1 and Tables 4 and 5. Under the legislated contribution rate the funding ratio is projected to reach approximately 25% by 2025 and increase slowly thereafter. Under the steady-state contribution rate, the funding ratio reaches a level of 22% by 2030 and remains relatively stable thereafter.

As a result of the 1997 reform, the assets began to increase and most importantly, at a faster rate than the growth in the unfunded liability (the portion not covered by the assets). As such, although the unfunded liability will increase over time, the funding ratio will continue to grow. In the long term, the assets are projected to grow at about 5% per annum, slightly outpacing the growth in liabilities. The historical and projected annual growth rates of the assets and liabilities are shown in Chart 2.

Table 4 Best-Estimate Financial Status – 9.9% Legislated Contribution Rate
($ million)

Year	PayGo Rate	Contributions	Expenditures	Net Cash Flow	Investment Earnings	Assets at 31 Dec.*	Yield	A/E Ratio	Normal Cost	Liabilities at 31 Dec.	Funding Ratio
	(%)						(%)		(% of cont. earn)		(%)
2004	8.27	28,608	23,895	4,713	4,530	76,857	6.43	3.08	5.46	615,293	12.49
2005	8.36	29,566	24,967	4,599	5,565	87,021	6.99	3.33	5.53	648,474	13.42
2006	8.43	30,667	26,124	4,543	6,294	97,858	7.02	3.57	5.63	683,654	14.31
2007	8.51	31,887	27,412	4,475	6,865	109,198	6.83	3.79	5.68	720,806	15.15
2008	8.59	33,202	28,810	4,392	7,460	121,050	6.67	4.00	5.71	759,932	15.93
2009	8.67	34,606	30,292	4,314	8,188	133,553	6.62	4.19	5.73	801,106	16.67
2010	8.73	36,128	31,868	4,260	8,982	146,795	6.60	4.37	5.77	844,513	17.38
2011	8.81	37,731	33,567	4,164	9,841	160,800	6.59	4.54	5.78	890,137	18.06
2012	8.88	39,518	35,437	4,081	10,839	175,720	6.64	4.69	5.77	938,021	18.73
2013	8.97	41,382	37,491	3,891	11,992	191,603	6.74	4.83	5.77	988,195	19.39
2014	9.04	43,436	39,674	3,762	13,258	208,623	6.84	4.96	5.73	1,040,621	20.05
2015	9.13	45,579	42,022	3,557	14,635	226,815	6.95	5.09	5.72	1,095,462	20.70
2016	9.22	47,851	44,542	3,309	15,891	246,015	6.95	5.21	5.71	1,152,765	21.34
2017	9.31	50,224	47,212	3,012	17,203	266,229	6.94	5.32	5.66	1,212,463	21.96
2018	9.42	52,590	50,046	2,544	18,585	287,359	6.94	5.42	5.64	1,274,660	22.54
2019	9.55	55,016	53,056	1,960	20,016	309,335	6.94	5.50	5.62	1,339,362	23.10
2020	9.68	57,537	56,253	1,284	21,497	332,116	6.93	5.57	5.61	1,406,659	23.61
2021	9.83	60,066	59,632	434	23,036	355,585	6.93	5.63	5.59	1,476,480	24.08
2022	9.98	62,687	63,175	(488)	24,526	379,624	6.90	5.67	5.58	1,548,986	24.51
2023	10.13	65,387	66,907	(1,520)	26,055	404,158	6.88	5.71	5.57	1,624,164	24.88
2024	10.27	68,241	70,820	(2,579)	27,598	429,177	6.85	5.73	5.57	1,702,164	25.21
2025	10.42	71,145	74,887	(3,742)	29,177	454,613	6.83	5.75	5.56	1,783,007	25.50
2026	10.55	74,183	79,078	(4,895)	30,771	480,489	6.81	5.76	5.57	1,867,018	25.74
2027	10.66	77,429	83,366	(5,937)	32,499	507,051	6.81	5.78	5.58	1,954,371	25.94
2028	10.75	80,795	87,772	(6,977)	34,274	534,348	6.82	5.79	5.58	2,045,229	26.13
2029	10.84	84,351	92,328	(7,977)	36,079	562,450	6.81	5.80	5.58	2,139,738	26.29
2030	10.91	88,011	97,015	(9,004)	37,958	591,404	6.81	5.81	5.58	2,238,106	26.42
2031	10.97	91,874	101,817	(9,943)	39,898	621,359	6.81	5.82	5.58	2,340,498	26.55
2032	11.00	95,998	106,708	(10,710)	41,912	652,560	6.81	5.84	5.58	2,447,305	26.66
2033	11.03	100,282	111,710	(11,428)	44,010	685,143	6.81	5.86	5.57	2,558,724	26.78
2034	11.04	104,774	116,877	(12,103)	46,204	719,243	6.81	5.88	5.55	2,674,967	26.89
2035	11.06	109,468	122,246	(12,778)	48,500	754,965	6.81	5.91	5.54	2,796,275	27.00
2040	11.07	136,240	152,278	(16,038)	61,823	962,443	6.81	6.05	5.46	3,487,424	27.60
2050	11.29	207,655	236,858	(29,203)	99,894	1,553,781	6.81	6.28	5.30	5,384,934	28.85
2060	11.52	314,268	365,642	(51,374)	156,849	2,437,440	6.81	6.39	5.28	8,224,777	29.64
2075	11.32	593,788	678,758	(84,970)	313,035	4,871,724	6.81	6.88	5.29	15,586,731	31.26

* All asset components are valued at market.

Table 5 Best-Estimate Financial Status – 9.8% Steady-State Contribution Rate
($ million)

Year	PayGo Rate	Contributions	Expenditures	Net Cash Flow	Investment Earnings	Assets at 31 Dec.*	Yield	A/E Ratio	Normal Cost	Liabilities at 31 Dec.	Funding Ratio
	(%)						(%)		(% of cont. earn)		(%)
2004	8.27	28,608	23,895	4,713	4,530	76,857	6.43	3.08	5.46	615,293	12.49
2005	8.36	29,566	24,967	4,599	5,565	87,021	6.99	3.33	5.53	648,474	13.42
2006	8.43	30,667	26,124	4,543	6,294	97,858	7.02	3.57	5.63	683,654	14.31
2007	8.51	31,565	27,412	4,153	6,852	108,863	6.83	3.78	5.68	720,806	15.10
2008	8.59	32,867	28,810	4,057	7,426	120,345	6.67	3.97	5.71	759,932	15.84
2009	8.67	34,256	30,292	3,964	8,130	132,440	6.63	4.16	5.73	801,106	16.53
2010	8.73	35,763	31,868	3,895	8,897	145,231	6.60	4.33	5.77	844,513	17.20
2011	8.81	37,350	33,567	3,783	9,724	158,739	6.59	4.48	5.78	890,137	17.83
2012	8.88	39,119	35,437	3,682	10,687	173,107	6.64	4.62	5.77	938,021	18.45
2013	8.97	40,964	37,491	3,473	11,799	188,380	6.74	4.75	5.77	988,195	19.06
2014	9.04	42,997	39,674	3,323	13,019	204,722	6.84	4.87	5.73	1,040,621	19.67
2015	9.13	45,119	42,022	3,097	14,345	222,164	6.94	4.99	5.72	1,095,462	20.28
2016	9.22	47,368	44,542	2,826	15,548	240,537	6.95	5.09	5.71	1,152,765	20.87
2017	9.31	49,716	47,212	2,504	16,801	259,843	6.94	5.19	5.66	1,212,463	21.43
2018	9.42	52,059	50,046	2,013	18,119	279,975	6.94	5.28	5.64	1,274,660	21.96
2019	9.55	54,460	53,056	1,404	19,480	300,860	6.94	5.35	5.62	1,339,362	22.46
2020	9.68	56,956	56,253	703	20,885	322,447	6.93	5.41	5.61	1,406,659	22.92
2021	9.83	59,459	59,632	(173)	22,339	344,614	6.93	5.45	5.59	1,476,480	23.34
2022	9.98	62,054	63,175	(1,122)	23,742	367,234	6.90	5.49	5.58	1,548,986	23.71
2023	10.13	64,726	66,907	(2,181)	25,174	390,227	6.88	5.51	5.57	1,624,164	24.03
2024	10.27	67,552	70,820	(3,269)	26,614	413,572	6.85	5.52	5.57	1,702,164	24.30
2025	10.42	70,427	74,887	(4,460)	28,080	437,192	6.83	5.53	5.56	1,783,007	24.52
2026	10.55	73,434	79,078	(5,644)	29,553	461,102	6.81	5.53	5.57	1,867,018	24.70
2027	10.66	76,647	83,366	(6,719)	31,145	485,527	6.81	5.53	5.58	1,954,371	24.84
2028	10.75	79,979	87,772	(7,793)	32,774	510,508	6.81	5.53	5.58	2,045,229	24.96
2029	10.84	83,499	92,328	(8,829)	34,420	536,099	6.81	5.53	5.58	2,139,738	25.05
2030	10.91	87,122	97,015	(9,893)	36,126	562,332	6.81	5.52	5.58	2,238,106	25.13
2031	10.97	90,946	101,817	(10,871)	37,879	589,340	6.81	5.52	5.58	2,340,498	25.18
2032	11.00	95,028	106,708	(11,680)	39,690	617,350	6.81	5.53	5.58	2,447,305	25.23
2033	11.03	99,269	111,710	(12,441)	41,570	646,479	6.81	5.53	5.57	2,558,724	25.27
2034	11.04	103,716	116,877	(13,161)	43,526	676,844	6.81	5.54	5.55	2,674,967	25.30
2035	11.06	108,362	122,246	(13,884)	45,566	708,526	6.81	5.54	5.54	2,796,275	25.34
2040	11.07	134,863	152,278	(17,415)	57,261	890,383	6.81	5.60	5.46	3,487,424	25.53
2050	11.29	205,557	236,858	(31,301)	89,503	1,390,068	6.81	5.62	5.30	5,384,934	25.81
2060	11.52	311,094	365,642	(54,548)	134,380	2,083,971	6.81	5.46	5.28	8,224,777	25.34
2075	11.32	587,790	678,758	(90,968)	245,486	3,810,550	6.81	5.38	5.29	15,586,731	24.45

* All asset components are valued at market.

Chart 1 Funding Ratio

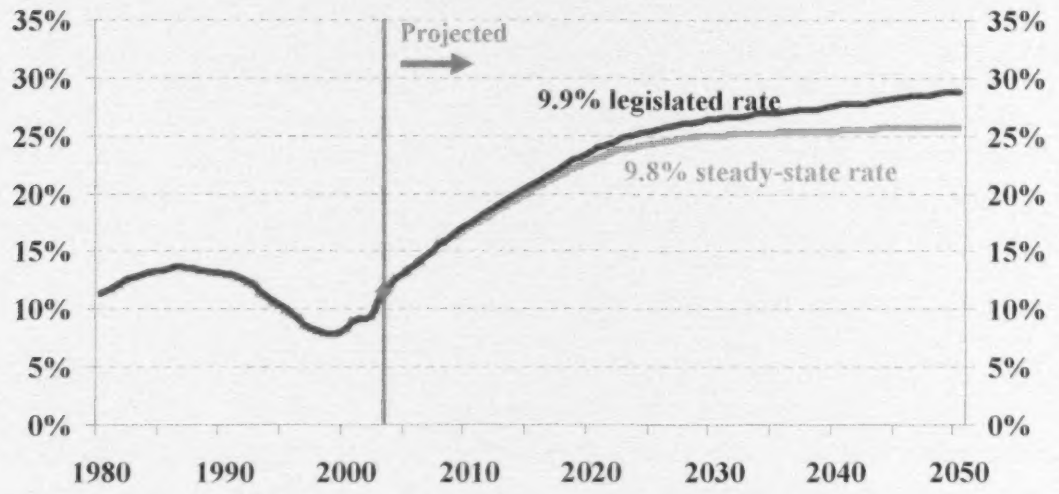
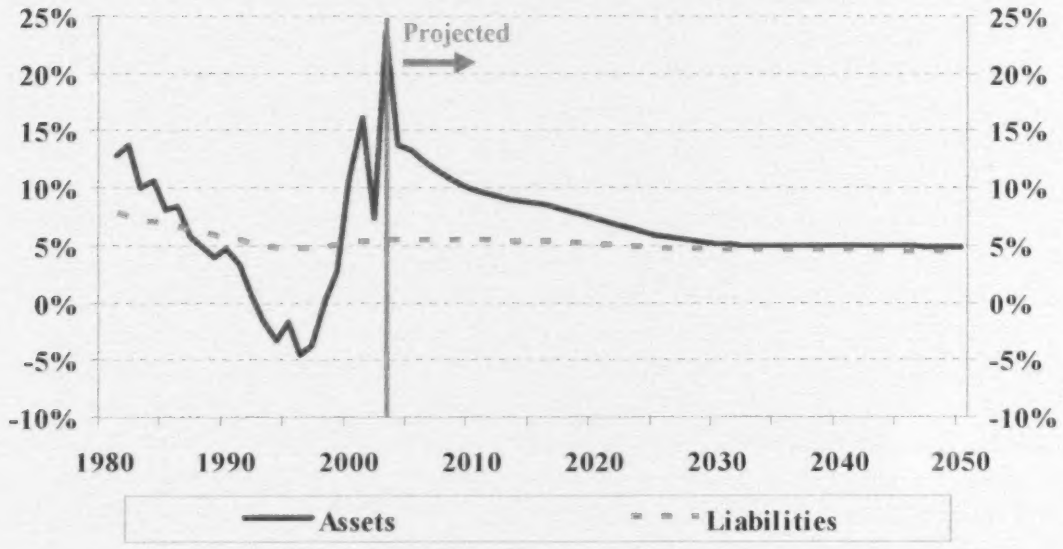


Chart 2 Annual Growth Rates of Assets and Liabilities



In the 21st CPP Actuarial Report and in this study, the normal costs and liabilities are determined by the projected unit credit actuarial cost method. For any given year, the normal cost represents the present value of future benefits earned in that year, while the liability represents the present value of projected benefits based on participation in the Plan up to that year. The ultimate nominal rate of return on assets (the yield) is used as the valuation rate to determine both present values.

By 2075, the normal cost reaches $317.3 billion or 5.3% of contributory earnings. If the Plan were fully funded by that time, then the ratio of contributions (the normal cost) to expenditures would be 47%. In comparison, if the Plan were funded on a PayGo basis,

then there would be no fund and contributions would equal expenditures, giving a contribution/expenditure ratio of 100%. As shown in Table 4, the projected funding ratio increases to 31% by 2075, and the ratio of contributions to expenditures correspondingly falls to 87% by that year. This shows that as the funding level of the Plan increases, from no fund to fully funded, contributions comprise a decreasing proportion of expenditures since higher levels of investment earnings are sufficient to cover the increasing shortfall. This is summarized in Table 6.

Table 6 Funding Ratio versus Contributions/Expenditures

Funding Method	Funding Ratio	Contributions/Expenditures
PayGo(*)	0%	100%
Current (9.9%, 2075)	31%	87%
Full	100%	47%

(*) Pure pay-as-you-go funding with no reserve fund.

PayGo, Full Funding and Steady-State Contribution Rates

Under the best-estimate assumptions of the 21st CPP Actuarial Report, the PayGo contribution rate is projected to exceed the steady-state contribution rate (9.8%) by 2021 and the legislated contribution rate (9.9%) by the following year. It is also expected that the real increase in total earnings will remain below the real rate of return on the Plan's assets. The real increase in total earnings consists of the increase in real wages and the increase in the number of earners. It is expected that, due to an anticipated labour shortage, the bulk of the increase in total earnings over the long term will come from an increase in real wages. Ultimately, total earnings are expected to grow by 1.5% from the combination of a 1.2% increase in real wages and 0.3% increase in the number of earners. In comparison, the ultimate real growth in investment returns is expected to be 4.1%.

As the real investment return is generally projected to exceed real growth in total earnings, it is expected that the PayGo rate would exceed the contribution rate required to maintain the Plan at a fully funded level (i.e. at a funding ratio of one) if the Plan were fully funded. This would be the case since the investment returns earned from fully funding the Plan would provide an additional source of funds to cover expenditures and would thus result in a lower required contribution rate compared to the PayGo rate.

As described in Pierre Treuil's note on the fund development of an earnings-related social insurance plan[1], under theoretical "stabilized conditions" where over the long term demographic and economic variables are assumed to reach a constant state and the Plan by that time has matured, both the PayGo rate and the full funding or "full cost" rate would be constant.

[1] Pierre Treuil, *Fund Development of an Earnings-Related Social Insurance Plan under Stabilized Conditions*, Transactions of Society of Actuaries, Vol. 33, pp. 231-250, January 1981.

The actual contribution rate, CR, may be expressed as a weighted average of the full cost and PayGo rates:

$$CR = n \cdot FC + (1 - n)PG \qquad (1)$$

where the weight $n = (CR - PG)/(FC - PG)$.

An equilibrium contribution rate, ER, is the rate that would maintain the funding ratio at a certain level. If the actual contribution rate is equal to the equilibrium rate, then $n = FR$, the constant funding ratio. It follows from equation (1) that:

$$\text{If } CR = ER \text{ then } CR = FR \cdot FC + (1 - FR)PG \qquad (2)$$

Under stabilized conditions, assets and liabilities grow at constant rates, which means that the funding ratio also remains constant. This would in turn give a constant steady-state contribution rate equal to the equilibrium rate.

As an example, if stabilized conditions were reached such that the full cost rate was at 5.56% and the PayGo rate was at 10.42%, then a weighted average of these two rates using a weight of 11% would result in an actual contribution rate of 9.9% (using equation (1)). These values for the full cost and PayGo rates pertain to the year 2025 in the best-estimate projection (see Table 4). If, instead, the full cost and PayGo rates stabilized at values of 5.29% and 11.32% (in 2075) respectively, and a target constant funding level of 25% were desired, then an equilibrium rate of 9.8% would be required to maintain the funding ratio at that level (using equation (2)).

Under stabilized conditions, if the PayGo rate is greater than the full cost rate (i.e. if real total earnings growth is less than real investment returns) and if the actual contribution rate is greater than the equilibrium (i.e. steady-state) rate, then the funding ratio thereafter will increase indefinitely; that is:

$$\text{If } PG > FC \text{ and } CR > ER_0 \text{ then } FR_t \rightarrow +\infty \text{ as } t \rightarrow \infty, \qquad (3)$$

where
PG = PayGo rate
FC = full cost rate
CR = actual contribution rate
ER_0 = equilibrium rate required to maintain a constant funding ratio of FR_0 at time = 0 under stabilized conditions
FR_t = funding ratio at time $t > 0$; $FR_t = Assets_t/Liabilities_t$

On the other hand, if the actual contribution rate is less than the equilibrium (steady-state) rate, then the fund will eventually deplete; that is,

$$\text{If } PG > FC \text{ and } CR < ER_0 \text{ then } FR_t \rightarrow -\infty \text{ as } t \rightarrow \infty \qquad (4)$$

The above equations show that if the actual contribution rate is the PayGo rate, then the funding ratio will increase indefinitely if its initial value is positive. On the other hand, if the actual rate is the full cost rate, then the fund will eventually deplete if the initial

funding ratio is less than one. With respect to the CPP, the actual (legislated) rate is greater than the steady-state rate and falls between the PayGo and full cost rates over the long term.

Although stabilized conditions are only theoretical as they would most likely not occur, over the very long term demographic and economic conditions could stabilize enough to approximate such conditions. It could then be argued that the increase in the funding ratio as projected over the next 75 years under the 21st CPP Actuarial Report could possibly continue into the very long term as long as the PayGo rate exceeds the full cost rate and the legislated rate exceeds the steady-state rate, as indicated by equation (3). This in turn would contribute to the very long-term financial sustainability of the Plan given an accompanying increase in economic output. However, even if such long-term conditions were to hold leading to an increase in the funding ratio, it should be noted that from its inception the CPP was never intended to be a fully funded plan.

VI. Sensitivity Tests

This section presents different scenarios which could develop in the future in comparison to the best-estimate scenario of the 21st CPP Actuarial Report. Plausible scenarios which could develop are first considered, they are the younger and older population scenarios. Much more extreme scenarios are also considered, specifically a much younger population in an environment of economic growth, a much older population with economic stagnation. These extreme scenarios, although possible, are considered highly unlikely to occur. Lastly, sensitivity analysis is also performed on the calculation methodology of the steady-state contribution rate. Specifically, this analysis shows how the steady-state contribution rate, the PayGo rate and asset/expenditure ratio vary based on alternative determination periods for the steady-state rate under each of the plausible and extreme scenarios.

All of the alternative scenarios presented are meant to show the sensitivity of the steady-state funding methodology, and more generally, the long-term projected financial status of the Plan under the best-estimate assumptions to changes in the future demographic and economic outlook. It could be argued that the choice of assumptions is subjective and that the range of possible outcomes presented here is not realistic. However, the scenarios presented are only meant to provide a range of possible outcomes for the costs of the Plan, and in the case of the more extreme scenarios, extreme limits of these ranges.

Various projected financial results are provided depending on the scenario, including the projected cash flows, assets, liabilities and funding ratios.

A. Plausible Scenarios

1. Assumptions

Table 7 presents a summary of the assumptions for the plausible scenarios.

Table 7 Summary of Sensitivity Test Assumptions – Plausible Scenarios

Canada	Younger Population	Best-Estimate	Older Population
Total fertility rate	1.80	1.60	1.40
Net migration rate	0.64%	0.54%	0.44%
Mortality	50% of best-estimate improvement rate	1995-97 Canada Life Tables with improvements	150% of best-estimate improvement rate
CPP disability incidence rates (per 1,000 eligible)	Males 3.00 Females 3.25	Males 3.25 Females 3.50	Males 3.50 Females 3.75
Labour force participation (2030+), (15-69)	Males 77% Females 67%	Males 78% Females 69%	Males 79% Females 70%
Unemployment rate	7.0%	6.5%	6.0%
Proportion of contributors (2030), (18-69)	Males 74% Females 66%	Males 75% Females 67%	Males 76% Females 69%
Real-wage differential	1.0%	1.2%	1.4%
Rate of increase in prices	2.5%	2.7%	3.0%
Real rate of return on investments	4.5%	4.1%	3.7%
Steady-State Rate	**9.3%**	**9.8%**	**10.3%**

2. Younger Population

This scenario is similar to that presented in the 21st CPP Actuarial Report. Under the younger population scenario, it is assumed that the total fertility rate is 1.80 children per woman for Canada. This rate is 0.20 higher than the best-estimate assumption. This rate could be attained if the current increasing trend in fertility for those aged 30 and older is extrapolated further in time. This level of fertility, however, is still well below the national population replacement rate of 2.1.

In this scenario, net migration to Canada is assumed to increase to a level of 0.64% of the population starting in 2004. This compares to an actual rate of 0.45% in 2003. Mortality is assumed to improve at half the best-estimate rate. This partly reflects the slowdown in mortality improvements observed over recent years and results in life expectancy at age 65 being reduced by over one year by 2075 for both males and females.

These younger population demographic assumptions give a retiree dependency ratio in Canada (i.e. the ratio of those aged 65 or older to those of working age between 20 and 64) of about 0.40 in 2050 (or 2.5 working-age persons per retiree). In comparison, the best-estimate retiree dependency ratio in that year is 0.45 (or 2.2 working-age persons per retiree).

It was assumed that under a better demographic outlook the anticipated labour shortage would be less severe. As such, it was assumed that the ultimate unemployment rate

would be slightly higher at 7.0% compared to the best-estimate rate of 6.5%, and that the labour force participation rates would be somewhat lower, especially for ages 55 and older. With a larger labour force there would be less pressure to continue to work to a later age, and both employers and unions would more easily manage early retirement. As a result, the proportion of contributors is lower compared to the best-estimate scenario.

Furthermore, due to the reduced risk of a labour shortage, there would be less pressure on average wages since the demand for workers would be met more easily. For this reason, the assumed ultimate real wage increase was reduced from its best-estimate level of 1.2% to 1.0%. Price levels are assumed to be lower as well under this scenario as the average consumer demand for goods and services could be met more easily from a larger labour force. The ultimate price increase assumption is 2.5% compared to the best-estimate rate of 2.7%.

Disability incidence rates are reduced under this scenario to reflect the slightly better economic conditions. Disability incidence rates are set at 3.00 per thousand for males and 3.25 per thousand for females.

Under this scenario, the ultimate real increase in total employment earnings is 1.7% compared to the best-estimate increase of 1.5%. The lower real-wage increase under a younger population scenario is more than offset by the higher population growth. As such, a larger real increase in total employment earnings results compared to the best-estimate.

Lastly, capital markets are assumed to perform much better under such conditions as individuals are generally better off economically and so are willing to take on additional risk. This would on average yield a higher return on their investments. For this purpose, the real rate of return on assets is increased by 0.4% to 4.5%. The nominal rate of return on assets is thus 7.0% or 0.2 percentage points greater than the best-estimate. The higher rate of return generates higher investment earnings and thus revenues to the Plan.

The resulting financial impact of a younger population scenario on the Plan is shown in Table 8, assuming the legislated contribution rate of 9.9% is maintained over the projection period. Under this scenario, the steady-state contribution rate falls half a percentage point from the best-estimate level of 9.8% to 9.3%. The financial projection under the steady-state rate is shown in Table 9.

Table 8 Younger Population Financial Status – 9.9% Legislated Contribution Rate
($ million)

Year	PayGo Rate	Contri-butions	Expen-ditures	Net Cash Flow	Invest-ment Earnings	Assets at 31 Dec.*	Yield	A/E Ratio	Normal Cost	Liabilities at 31 Dec.	Funding Ratio
	(%)						(%)		(% of cont. earn)		(%)
2004	8.25	28,655	23,882	4,773	4,712	77,099	6.69	3.09	4.88	582,320	13.24
2005	8.32	29,664	24,932	4,732	5,831	87,662	7.30	3.36	4.93	612,725	14.31
2006	8.37	30,821	26,068	4,753	6,633	99,048	7.33	3.62	5.00	644,901	15.36
2007	8.43	32,102	27,337	4,765	7,298	111,110	7.16	3.87	5.04	678,814	16.37
2008	8.49	33,483	28,718	4,765	7,998	123,874	7.02	4.10	5.05	714,446	17.34
2009	8.55	34,960	30,185	4,775	8,849	137,498	6.98	4.33	5.04	751,832	18.29
2010	8.60	36,563	31,751	4,812	9,784	152,094	6.97	4.55	5.06	791,141	19.22
2011	8.65	38,255	33,441	4,814	10,805	167,714	6.97	4.75	5.04	832,319	20.15
2012	8.73	40,054	35,305	4,749	11,987	184,449	7.03	4.94	5.02	875,336	21.07
2013	8.81	41,955	37,354	4,601	13,344	202,394	7.13	5.12	4.99	920,169	22.00
2014	8.91	43,902	39,532	4,370	14,634	221,398	7.14	5.29	4.97	966,832	22.90
2015	9.01	45,998	41,843	4,155	16,001	241,554	7.15	5.46	4.94	1,015,388	23.79
2016	9.11	48,105	44,280	3,825	17,427	262,806	7.15	5.61	4.92	1,065,884	24.66
2017	9.22	50,285	46,850	3,435	18,919	285,160	7.14	5.75	4.90	1,118,307	25.50
2018	9.35	52,496	49,572	2,924	20,492	308,577	7.14	5.88	4.88	1,172,725	26.31
2019	9.47	54,850	52,455	2,395	22,131	333,103	7.14	6.00	4.86	1,229,106	27.10
2020	9.60	57,242	55,510	1,732	23,841	358,676	7.14	6.11	4.85	1,287,569	27.86
2021	9.77	59,483	58,724	759	25,621	385,056	7.13	6.20	4.82	1,347,847	28.57
2022	9.93	61,864	62,082	(218)	27,357	412,195	7.11	6.28	4.83	1,410,197	29.23
2023	10.11	64,271	65,606	(1,335)	29,145	440,006	7.08	6.35	4.81	1,474,491	29.84
2024	10.26	66,848	69,285	(2,437)	30,958	468,526	7.06	6.41	4.80	1,540,854	30.41
2025	10.41	69,484	73,091	(3,607)	32,821	497,741	7.04	6.46	4.80	1,609,339	30.93
2026	10.55	72,261	76,993	(4,732)	34,720	527,729	7.02	6.52	4.80	1,680,133	31.41
2027	10.66	75,201	80,965	(5,765)	36,787	558,752	7.02	6.57	4.80	1,753,378	31.87
2028	10.75	78,270	85,024	(6,754)	38,928	590,925	7.02	6.62	4.80	1,829,185	32.31
2029	10.84	81,485	89,200	(7,715)	41,125	624,335	7.01	6.68	4.80	1,907,695	32.73
2030	10.90	84,862	93,475	(8,613)	43,436	659,158	7.01	6.74	4.79	1,989,019	33.14
2031	10.94	88,555	97,833	(9,278)	45,854	695,734	7.01	6.80	4.79	2,073,506	33.55
2032	10.95	92,468	102,248	(9,780)	48,400	734,353	7.02	6.88	4.78	2,161,323	33.98
2033	10.94	96,615	106,742	(10,127)	51,094	775,320	7.02	6.96	4.77	2,252,732	34.42
2034	10.93	100,878	111,363	(10,485)	53,953	818,788	7.02	7.05	4.75	2,347,817	34.87
2035	10.91	105,366	116,145	(10,780)	56,990	864,999	7.02	7.14	4.74	2,446,846	35.35
2040	10.77	131,119	142,586	(11,467)	75,468	1,146,601	7.02	7.72	4.64	3,006,956	38.13
2050	10.65	199,998	215,110	(15,112)	136,258	2,072,481	7.02	9.25	4.51	4,530,024	45.75
2060	10.48	304,646	322,513	(17,867)	252,035	3,837,571	7.02	11.44	4.48	6,813,574	56.32
2075	10.02	579,623	586,409	(6,786)	674,695	10,289,890	7.02	16.82	4.45	12,821,648	80.25

* All asset components are valued at market.

Table 9 Younger Population Financial Status – 9.3% Steady-State Contribution Rate
($ million)

Year	PayGo Rate	Contri-butions	Expen-ditures	Net Cash Flow	Invest-ment Earnings	Assets at 31 Dec.*	Yield	A/E Ratio	Normal Cost	Liabilities at 31 Dec.	Funding Ratio
	(%)						(%)		(% of cont. earn)		(%)
2004	8.25	28,655	23,882	4,773	4,712	77,099	6.69	3.09	4.88	582,320	13.24
2005	8.32	29,664	24,932	4,732	5,831	87,662	7.30	3.36	4.93	612,725	14.31
2006	8.37	30,821	26,068	4,753	6,633	99,048	7.33	3.62	5.00	644,901	15.36
2007	8.43	30,156	27,337	2,819	7,215	109,082	7.16	3.80	5.04	678,814	16.07
2008	8.49	31,454	28,718	2,736	7,779	119,597	7.03	3.96	5.05	714,446	16.74
2009	8.55	32,842	30,185	2,657	8,473	130,727	6.99	4.12	5.04	751,832	17.39
2010	8.60	34,347	31,751	2,596	9,230	142,553	6.98	4.26	5.06	791,141	18.02
2011	8.65	35,937	33,441	2,496	10,050	155,099	6.98	4.39	5.04	832,319	18.63
2012	8.73	37,626	35,305	2,321	11,000	168,420	7.03	4.51	5.02	875,336	19.24
2013	8.81	39,412	37,354	2,058	12,093	182,571	7.13	4.62	4.99	920,169	19.84
2014	8.91	41,242	39,532	1,710	13,105	197,386	7.14	4.72	4.97	966,832	20.42
2015	9.01	43,210	41,843	1,367	14,165	212,918	7.15	4.81	4.94	1,015,388	20.97
2016	9.11	45,190	44,280	910	15,255	229,083	7.15	4.89	4.92	1,065,884	21.49
2017	9.22	47,238	46,850	388	16,379	245,849	7.14	4.96	4.90	1,118,307	21.98
2018	9.35	49,314	49,572	(258)	17,547	263,138	7.14	5.02	4.88	1,172,725	22.44
2019	9.47	51,526	52,455	(929)	18,743	280,952	7.14	5.06	4.86	1,229,106	22.86
2020	9.60	53,773	55,510	(1,737)	19,969	299,184	7.13	5.09	4.85	1,287,569	23.24
2021	9.77	55,878	58,724	(2,846)	21,218	317,556	7.13	5.12	4.82	1,347,847	23.56
2022	9.93	58,115	62,082	(3,967)	22,395	335,984	7.10	5.12	4.83	1,410,197	23.83
2023	10.11	60,376	65,606	(5,230)	23,576	354,330	7.08	5.11	4.81	1,474,491	24.03
2024	10.26	62,796	69,285	(6,489)	24,734	372,576	7.06	5.10	4.80	1,540,854	24.18
2025	10.41	65,273	73,091	(7,818)	25,888	390,646	7.04	5.07	4.80	1,609,339	24.27
2026	10.55	67,882	76,993	(9,111)	27,021	408,556	7.01	5.05	4.80	1,680,133	24.32
2027	10.66	70,643	80,965	(10,322)	28,232	426,466	7.02	5.02	4.80	1,753,378	24.32
2028	10.75	73,526	85,024	(11,498)	29,445	444,413	7.02	4.98	4.80	1,829,185	24.30
2029	10.84	76,546	89,200	(12,654)	30,643	462,402	7.01	4.95	4.80	1,907,695	24.24
2030	10.90	79,719	93,475	(13,756)	31,863	480,508	7.01	4.91	4.79	1,989,019	24.16
2031	10.94	83,188	97,833	(14,645)	33,099	498,962	7.01	4.88	4.79	2,073,506	24.06
2032	10.95	86,864	102,248	(15,384)	34,363	517,941	7.02	4.85	4.78	2,161,323	23.96
2033	10.94	90,759	106,742	(15,983)	35,670	537,629	7.02	4.83	4.77	2,252,732	23.87
2034	10.93	94,764	111,363	(16,599)	37,025	558,055	7.02	4.80	4.75	2,347,817	23.77
2035	10.91	98,980	116,145	(17,165)	38,435	579,325	7.02	4.78	4.74	2,446,846	23.68
2040	10.77	123,172	142,586	(19,414)	46,549	702,194	7.02	4.73	4.64	3,006,956	23.35
2050	10.65	187,877	215,110	(27,233)	69,873	1,054,812	7.02	4.71	4.51	4,530,024	23.28
2060	10.48	286,183	322,513	(36,330)	106,939	1,616,556	7.02	4.82	4.48	6,813,574	23.73
2075	10.02	544,494	586,409	(41,915)	229,965	3,491,069	7.02	5.71	4.45	12,821,648	27.23

* All asset components are valued at market.

Under a younger population scenario, the PayGo rate decreases over the long term compared to the best-estimate rate. Although a younger population leads to a greater number of contributors, the nominal increase in wages is lower than in the best-estimate case (i.e. 3.5% compared to 3.9%). This ultimately leads to lower total contributory earnings. However, less expenditures are also paid from the Plan mainly because lower inflation results in less indexation of benefits in pay. Less expenditures also result from less disability benefits beings paid. The lower expenditures more than offset the higher death benefits that are paid due to higher mortality levels. The overall expenditures fall to a greater extent than contributory earnings when compared to their best-estimates. As a result, the PayGo rate is also lower. The fall in the PayGo rate eases pressure on the steady-state contribution rate, which in turn lowers the steady-state rate.

As the gap between the legislated and steady-state contribution rates increases from 0.1% (9.9% less 9.8%) in the best-estimate case to 0.6% (9.9% less 9.3%) with a younger population, revenues to the Plan substantially rise by the end of the projection period. The gap in the rates represents what is actually contributed to the Plan compared to what is required to be contributed to financially sustain the Plan over the long term. A greater difference in the rates translates into a greater amount of contributions and thus revenues to the Plan as the contributions grow with investment earnings. The increase in revenues together with the decrease in expenditures results in an asset/expenditure ratio near a level of 17 and a funding ratio of over 80% by the year 2075 (see Table 8).

The projected normal costs and liabilities are lower compared to their best-estimates due to the combination of lower expenditures and a higher ultimate nominal rate of return (i.e. a valuation rate of 7.0% compared to the best-estimate 6.8%). The difference between the lower liabilities and higher assets gives a much lower unfunded liability as reflected in the higher funding ratio.

3. Older Population

This scenario is similar to that presented in the 21st CPP Actuarial Report. Under the older population scenario, it is assumed that the total fertility rate is 1.40 children per woman for Canada. This is 0.20 lower than the best-estimate assumption. This rate could be attained if fewer women have multiple births over their lifetime. This level of fertility is significantly below the national population replacement rate of 2.1.

In this scenario, net migration to Canada is assumed to fall to a level of 0.44% of the population starting in 2004. Mortality is assumed to improve at a rate that is 50% higher than the best-estimate rate. This results in life expectancy at age 65 being increased by about one year for both males and females.

These older population demographic assumptions result in a retiree dependency ratio of about 0.51 (or 2.0 working-age persons per retiree) in 2050 compared to the best-estimate ratio of 0.45 in that year.

It was assumed that under a worse demographic outlook the anticipated labour shortage would be more severe. As such, it was assumed that the ultimate unemployment rate

would be slightly lower at 6.0% compared to the best-estimate rate of 6.5%, and that the labour force participation rates would be somewhat higher, especially for ages 55 and older. With a smaller labour force there would be more pressure to continue to work to a later age, and early retirement would be more difficult to manage for both employers and unions. As a result, the proportion of contributors is higher compared to the best-estimate scenario.

Furthermore, due to the increased risk of a labour shortage, there would be upward pressure on average wages since it would be more difficult to meet the demand for workers. For this reason, the assumed ultimate real wage growth was increased from its best-estimate level of 1.2% to 1.4%. Price levels are assumed to be higher as well under this scenario as a reduced labour force cannot meet the consumer demand for goods and services as economically. The ultimate price increase assumption is 3.0% compared to the best-estimate rate of 2.7%.

Disability incidence rates are increased under this scenario to reflect the slightly worse economic conditions. Disability incidence rates are set at 3.50 per thousand for males and 3.75 per thousand for females.

Under this scenario, the ultimate real increase in total employment earnings is 1.3% compared to the best-estimate increase of 1.5%. The higher real-wage increase under an older population scenario is more than offset by the lower population growth. As such, a smaller real increase in total employment earnings results compared to the best-estimate.

Lastly, capital markets are assumed to perform worse under such conditions as individuals are generally worse off economically and so are less willing to take on risk. This would on average yield a lower return on their investments. For this purpose, the real rate of return on assets is decreased by 0.4% to 3.7%. The nominal rate of return on assets is thus 6.7% or 0.1 percentage points less than the best-estimate. The lower rate of return generates lower investment earnings and thus revenues to the Plan.

The financial impact of an older population scenario on the Plan is shown in Table 10, assuming the legislated contribution rate of 9.9% is maintained over the projection period. Under this scenario, the steady-state contribution rate increases by half a percentage point from the best-estimate level to 10.3%. The financial projection under the steady-state rate is shown in Table 11.

Table 10 Older Population Financial Status – 9.9% Legislated Contribution Rate
($ million)

Year	PayGo Rate	Contributions	Expenditures	Net Cash Flow	Investment Earnings	Assets at 31 Dec.*	Yield	A/E Ratio	Normal Cost	Liabilities at 31 Dec.	Funding Ratio
	(%)						(%)		(% of cont. earn)		(%)
2004	8.28	28,588	23,908	4,680	4,348	76,641	6.18	3.07	6.10	650,267	11.79
2005	8.38	29,524	25,005	4,519	5,308	86,468	6.69	3.30	6.21	687,138	12.58
2006	8.47	30,602	26,185	4,417	5,972	96,856	6.70	3.52	6.35	726,379	13.33
2007	8.56	31,796	27,495	4,301	6,460	107,617	6.50	3.72	6.43	767,963	14.01
2008	8.65	33,082	28,914	4,168	6,966	118,750	6.33	3.90	6.49	811,947	14.63
2009	8.74	34,454	30,415	4,039	7,592	130,382	6.27	4.07	6.54	858,434	15.19
2010	8.82	35,942	32,010	3,932	8,271	142,584	6.23	4.23	6.61	907,680	15.71
2011	8.89	37,576	33,726	3,850	9,134	155,568	6.30	4.36	6.65	959,746	16.21
2012	8.97	39,347	35,641	3,706	10,161	169,434	6.44	4.49	6.67	1,014,664	16.70
2013	9.06	41,284	37,774	3,510	11,210	184,154	6.54	4.60	6.68	1,072,468	17.17
2014	9.12	43,457	40,049	3,408	12,360	199,923	6.64	4.70	6.63	1,133,146	17.64
2015	9.20	45,723	42,497	3,226	13,802	216,951	6.84	4.80	6.64	1,197,012	18.12
2016	9.28	48,186	45,162	3,024	14,965	234,939	6.84	4.89	6.62	1,264,024	18.59
2017	9.36	50,776	47,997	2,779	16,177	253,895	6.84	4.98	6.57	1,334,204	19.03
2018	9.46	53,398	51,017	2,381	17,455	273,731	6.84	5.05	6.55	1,407,738	19.44
2019	9.56	56,149	54,233	1,916	18,781	294,428	6.83	5.11	6.53	1,484,705	19.83
2020	9.68	58,979	57,663	1,316	20,154	315,898	6.83	5.15	6.52	1,565,224	20.18
2021	9.81	61,873	61,304	569	21,583	338,050	6.83	5.19	6.48	1,649,166	20.50
2022	9.95	64,810	65,142	(332)	22,964	360,683	6.80	5.21	6.48	1,736,851	20.77
2023	10.09	67,879	69,205	(1,326)	24,377	383,734	6.77	5.22	6.46	1,828,322	20.99
2024	10.23	71,086	73,487	(2,401)	25,801	407,134	6.75	5.22	6.45	1,923,695	21.16
2025	10.38	74,390	77,962	(3,572)	27,254	430,815	6.73	5.22	6.45	2,023,174	21.29
2026	10.51	77,812	82,601	(4,789)	28,710	454,736	6.71	5.20	6.47	2,127,057	21.38
2027	10.62	81,482	87,381	(5,899)	30,280	479,117	6.71	5.19	6.47	2,235,570	21.43
2028	10.72	85,261	92,323	(7,062)	31,880	503,935	6.71	5.17	6.48	2,349,033	21.45
2029	10.82	89,164	97,465	(8,301)	33,486	529,120	6.71	5.15	6.49	2,467,599	21.44
2030	10.91	93,311	102,789	(9,478)	35,139	554,780	6.71	5.12	6.48	2,591,517	21.41
2031	10.99	97,554	108,280	(10,726)	36,819	580,873	6.71	5.10	6.48	2,721,034	21.35
2032	11.06	101,989	113,912	(11,923)	38,529	607,479	6.71	5.07	6.48	2,856,536	21.27
2033	11.11	106,669	119,709	(13,040)	40,273	634,712	6.71	5.05	6.48	2,998,374	21.17
2034	11.16	111,539	125,730	(14,191)	42,056	662,577	6.71	5.02	6.48	3,146,907	21.05
2035	11.21	116,641	132,020	(15,379)	43,880	691,078	6.71	4.99	6.46	3,302,288	20.93
2040	11.39	145,782	167,746	(21,964)	53,616	843,124	6.71	4.79	6.40	4,194,734	20.10
2050	12.03	223,304	271,400	(48,096)	73,386	1,146,654	6.71	4.03	6.24	6,681,815	17.16
2060	12.75	337,267	434,446	(97,179)	77,750	1,195,978	6.71	2.63	6.21	10,432,022	11.46
2075	12.96	636,766	833,279	(196,513)	–	–	–	–	6.28	20,087,964	–

* All asset components are valued at market.

Table 11 Older Population Financial Status – 10.3% Steady-State Contribution Rate
($ million)

Year	PayGo Rate	Contri-butions	Expen-ditures	Net Cash Flow	Invest-ment Earnings	Assets at 31 Dec.*	Yield	A/E Ratio	Normal Cost	Liabilities at 31 Dec.	Funding Ratio
	(%)						(%)		(% of cont. earn)		(%)
2004	8.28	28,588	23,908	4,680	4,348	76,641	6.18	3.07	6.10	650,267	11.79
2005	8.38	29,524	25,005	4,519	5,308	86,468	6.69	3.30	6.21	687,138	12.58
2006	8.47	30,602	26,185	4,417	5,972	96,856	6.70	3.52	6.35	726,379	13.33
2007	8.56	33,080	27,495	5,585	6,510	108,951	6.50	3.77	6.43	767,963	14.19
2008	8.65	34,418	28,914	5,504	7,094	121,549	6.32	4.00	6.49	811,947	14.97
2009	8.74	35,846	30,415	5,431	7,810	134,790	6.26	4.21	6.54	858,434	15.70
2010	8.82	37,394	32,010	5,384	8,590	148,764	6.23	4.41	6.61	907,680	16.39
2011	8.89	39,095	33,726	5,369	9,574	163,707	6.30	4.59	6.65	959,746	17.06
2012	8.97	40,937	35,641	5,296	10,744	179,747	6.44	4.76	6.67	1,014,664	17.71
2013	9.06	42,952	37,774	5,178	11,948	196,873	6.54	4.92	6.68	1,072,468	18.36
2014	9.12	45,213	40,049	5,164	13,274	215,311	6.64	5.07	6.63	1,133,146	19.00
2015	9.20	47,570	42,497	5,073	14,932	235,316	6.84	5.21	6.64	1,197,012	19.66
2016	9.28	50,133	45,162	4,971	16,303	256,590	6.84	5.35	6.62	1,264,024	20.30
2017	9.36	52,827	47,997	4,830	17,743	279,163	6.84	5.47	6.57	1,334,204	20.92
2018	9.46	55,555	51,017	4,538	19,274	302,976	6.84	5.59	6.55	1,407,738	21.52
2019	9.56	58,418	54,233	4,185	20,875	328,036	6.83	5.69	6.53	1,484,705	22.09
2020	9.68	61,362	57,663	3,699	22,551	354,285	6.83	5.78	6.52	1,565,224	22.63
2021	9.81	64,373	61,304	3,069	24,311	381,666	6.83	5.86	6.48	1,649,166	23.14
2022	9.95	67,429	65,142	2,287	26,043	409,996	6.80	5.92	6.48	1,736,851	23.61
2023	10.09	70,621	69,205	1,416	27,837	439,249	6.78	5.98	6.46	1,828,322	24.02
2024	10.23	73,958	73,487	471	29,672	469,393	6.75	6.02	6.45	1,923,695	24.40
2025	10.38	77,396	77,962	(566)	31,572	500,398	6.73	6.06	6.45	2,023,174	24.73
2026	10.51	80,956	82,601	(1,645)	33,510	532,263	6.71	6.09	6.47	2,127,057	25.02
2027	10.62	84,774	87,381	(2,607)	35,620	565,277	6.71	6.12	6.47	2,235,570	25.29
2028	10.72	88,706	92,323	(3,617)	37,806	599,466	6.71	6.15	6.48	2,349,033	25.52
2029	10.82	92,766	97,465	(4,699)	40,044	634,811	6.71	6.18	6.49	2,467,599	25.73
2030	10.91	97,081	102,789	(5,708)	42,386	671,489	6.71	6.20	6.48	2,591,517	25.91
2031	10.99	101,495	108,280	(6,785)	44,813	709,517	6.71	6.23	6.48	2,721,034	26.08
2032	11.06	106,110	113,912	(7,802)	47,331	749,046	6.71	6.26	6.48	2,856,536	26.22
2033	11.11	110,978	119,709	(8,731)	49,951	790,266	6.71	6.29	6.48	2,998,374	26.36
2034	11.16	116,045	125,730	(9,685)	52,681	833,262	6.71	6.31	6.48	3,146,907	26.48
2035	11.21	121,354	132,020	(10,666)	55,529	878,125	6.71	6.34	6.46	3,302,288	26.59
2040	11.39	151,672	167,746	(16,074)	71,763	1,133,906	6.71	6.44	6.40	4,194,734	27.03
2050	12.03	232,327	271,400	(39,073)	114,758	1,807,819	6.71	6.35	6.24	6,681,815	27.06
2060	12.75	350,894	434,446	(83,552)	167,032	2,620,418	6.71	5.76	6.21	10,432,022	25.12
2075	12.96	662,494	833,279	(170,785)	246,774	3,852,113	6.71	4.43	6.28	20,087,964	19.18

* All asset components are valued at market.

Under an older population scenario, the PayGo rate increases over the long term compared to the best-estimate rate. Although an older population leads to fewer contributors, the nominal increase in wages is higher than in the best-estimate case (i.e. 4.4% compared to 3.9%). This ultimately leads to greater total contributory earnings. However, greater expenditures are also paid from the Plan mainly because higher inflation results in greater indexation of benefits in pay. Higher expenditures also result from more disability benefits being paid. The greater expenditures more than offset the lower death benefits that are paid due to lower mortality levels. The overall expenditures increase to a greater extent than contributory earnings when compared to their best-estimates. As a result, the PayGo rate increases. The rise in the PayGo rate places increased pressure on the steady-state contribution rate, which raises the steady-state rate.

The steady-state contribution rate increases above the legislated rate by 0.4 percentage points (10.3% less 9.9%). As such, the legislated rate is insufficient to maintain the Plan. The assets are completely depleted by the end of the projection period, giving an asset/expenditure ratio and funding ratio of zero by that time.

The projected normal costs and liabilities are higher compared to their best-estimates due to the combination of higher expenditures and a lower ultimate nominal rate of return (valuation rate of 6.7% compared to the best-estimate 6.8%). The unfunded liability grows to reach the liabilities by 2075 as the assets are depleted by that time.

B. Extreme Scenarios

1. Assumptions

Table 12 presents a summary of the assumptions for the extreme scenarios.

Table 12 Summary of Sensitivity Test Assumptions – Extreme Scenarios

Canada	Much Younger Population with Economic Growth	Much Older Population with Economic Stagnation
Total fertility rate	2.00	1.20
Net migration rate	0.74%	0.34%
Mortality	25% of best-estimate improvement rate	200% of best-estimate improvement rate
CPP disability incidence rates (per 1,000 eligible)	Males 2.50 Females 2.75	Males 4.00 Females 4.25
Labour force participation (2030+), (15-69)	Males 81% Females 81%	Males 76% Females 65%
Unemployment rate	4.5%	8.0%
Proportion of contributors (2030), (18-69)	Males 80% Females 81%	Males 71% Females 63%
Real-wage differential	2.0%	0.5%
Rate of increase in prices	2.5%	3.0%
Real rate of return on investments	4.5%	3.7%
Steady-State Rate	**7.6%**	**12.0%**

2. Much Younger Population with Economic Growth

This scenario represents an extreme variation of the younger population scenario. Under this scenario the total fertility rate for Canada is assumed at 2.0 children per woman, which is 0.4 higher than the best-estimate assumption. This level of fertility is significantly higher than the best-estimate level and has not been observed since the early 1970s. It is not likely that the fertility rate in Canada would rise back to this level, which is only slightly below the replacement rate of 2.1.

In this scenario, net migration to Canada is increased to 0.74% of the population starting in 2004, or 0.2% higher than the ultimate best-estimate level. Mortality is assumed to improve at only one quarter the best-estimate rate. Such a decline in mortality improvement would lower life expectancy at age 65 by over two years by 2075 for both males and females. The much younger population in this scenario gives a retiree dependency ratio of 0.37 in 2050, or 2.7 working-age persons per retiree.

With a much younger population and strong economic growth it is assumed that the unemployment rate would be much lower at 4.5% and that the labour force participation rates would increase significantly, especially for women, as the population is more actively engaged in the workforce. By 2030, the labour force participation rates for both male and female groups aged 15 to 69 are assumed to reach over 80%, and this leads to a significant increase in the proportion of contributors.

Under such conditions, there would be a continuous demand for labour which would in turn place significant pressure on average wages. It was thus assumed that the ultimate real wage increase would rise to 2.0%. With low unemployment and a large workforce the consumer demand for goods and services would be able to be met more easily. As such, the ultimate inflation level is assumed at 2.5%.

Disability incidence rates are significantly reduced under this scenario to reflect strong economic conditions. Disability incidence rates are set at 2.50 per thousand for males and 2.75 per thousand for females.

Under this scenario, the ultimate real increase in total employment earnings is 3.2%. This high growth reflects both the significantly higher real wages and strong population growth. In addition, favourable economic conditions are assumed to lead to higher performance in the capital markets. The real return on assets is thus assumed at 4.5%. Together with inflation, the nominal rate of return on assets becomes 7.0%, which increases revenues to the Plan.

The financial impact of this scenario on the Plan under the legislated contribution rate is shown in Table 13. Under this scenario, the steady-state contribution rate falls 2.2 percentage points from the best-estimate rate to 7.6%.

Table 13 Much Younger Population with Economic Growth Financial Status – 9.9% Legislated Contribution Rate
($ million)

Year	PayGo Rate	Contributions	Expenditures	Net Cash Flow	Investment Earnings	Assets at 31 Dec.*	Yield	A/E Ratio
	(%)						(%)	
2004	8.23	28,689	23,854	4,835	4,715	77,164	6.69	3.10
2005	8.27	29,749	24,855	4,894	5,843	87,901	7.30	3.39
2006	8.28	31,027	25,945	5,082	6,663	99,646	7.33	3.67
2007	8.28	32,488	27,168	5,320	7,361	112,327	7.16	3.94
2008	8.30	34,011	28,504	5,507	8,110	125,944	7.02	4.21
2009	8.28	35,780	29,926	5,854	9,033	140,831	6.98	4.48
2010	8.25	37,714	31,446	6,268	10,071	157,170	6.97	4.75
2015	7.99	51,533	41,572	9,961	17,826	271,262	7.15	6.15
2020	7.94	70,083	56,188	13,895	30,039	456,597	7.14	7.64
2025	8.09	93,638	76,533	17,105	48,002	736,934	7.04	9.06
2030	8.05	126,031	102,449	23,582	75,177	1,156,520	7.01	10.68
2040	7.82	222,256	175,447	46,809	179,679	2,760,158	7.02	14.90
2050	7.82	386,899	305,641	81,258	413,786	6,345,586	7.02	19.63
2060	7.77	674,089	529,271	144,818	917,693	14,058,759	7.02	25.18
2075	7.47	1,572,719	1,186,430	386,289	2,951,370	45,181,612	7.02	35.98

* All asset components are valued at market.

Under a much younger population with economic growth scenario, the PayGo rate decreases dramatically over the long term, falling to 7.5% by 2075. This level is lower than the steady-state contribution rate of 7.6%. The increase in the size of the population leads to more contributors compared to the best-estimate. A greater number of contributors in combination with higher real wages cause total contributory earnings to increase significantly. More contributors also eventually lead to an increase in expenditures compared to the best-estimate. Although the expenditures rise, the increase in earnings is much greater and thus causes a significant fall in the PayGo rate. As a result, the steady-state contribution rate is also much lower under this scenario.

The gap between the legislated and steady-state contribution rates increases from 0.1% in the best-estimate case to 2.3% (9.9% less 7.6%) under this scenario. This allows revenues to the Plan to grow substantially. By 2075, assets reach over $45 trillion and the A/E ratio approaches a level of 36.

3. Much Older Population with Economic Stagnation

This scenario represents an extreme variation of the older population scenario. Under this scenario, the total fertility rate for Canada is assumed to be 1.2 per woman, which is 0.4 lower than the best-estimate assumption. This level of fertility is significantly lower than the best-estimate level and has not been observed historically in Canada.

In this scenario, net migration to Canada is decreased to 0.34% of the population starting in 2004, or 0.2% lower than the ultimate best-estimate level. Mortality is

assumed to improve at twice the best-estimate rate. Such an improvement in mortality would increase life expectancy at 65 by close to three years by 2075 for both males and females. The much older population in this scenario gives a retiree dependency ratio of 0.58 in 2050, or 1.7 working-age persons per retiree.

With a much older population and economic stagnation it is assumed that the unemployment rate would be much higher at 8.0% and that the labour force participation rates would decrease significantly, especially for women, as the population is less actively engaged in the workforce. By 2030, the labour force participation rate for the group aged 15 to 69 is assumed to fall to 70%, and this leads to a significant decrease in the proportion of contributors.

Under such conditions, there would be little demand for labour which would in turn reduce pressure on average wages. It was thus assumed that the ultimate real wage increase would be much lower at 0.5%. With high unemployment and a small workforce the consumer demand for goods and services would not be met. As such, the ultimate inflation level is assumed at 3.0%.

Disability incidence rates are significantly increased under this scenario to reflect the poor economic environment. Disability incidence rates are set at 4.00 per thousand for males and 4.25 per thousand for females.

Under this scenario, the ultimate real change in total employment earnings is -0.1%. This decrease reflects both the significantly lower real wages and decline in the size of the population. In addition, significantly worse economic conditions are assumed to lead to poor performance in the capital markets. The real return on assets is thus assumed at 3.7%. The resulting nominal rate of return on assets is 6.7%, which decreases revenues to the Plan compared to the best-estimate.

The financial impact of this scenario on the Plan under the legislated contribution rate is shown in Table 14. Under this scenario, the steady-state contribution rate increases by 2.2 percentage points from the best-estimate rate to 12.0%.

Table 14 Much Older Population with Economic Stagnation Financial Status – 9.9% Legislated Contribution Rate
($ million)

Year	PayGo Rate	Contributions	Expenditures	Net Cash Flow	Investment Earnings	Assets at 31 Dec.*	Yield	A/E Ratio
	(%)						(%)	
2004	8.31	28,525	23,935	4,590	4,344	76,548	6.18	3.05
2005	8.45	29,395	25,080	4,315	5,294	86,157	6.69	3.28
2006	8.57	30,381	26,306	4,075	5,940	96,172	6.71	3.48
2007	8.71	31,431	27,660	3,771	6,399	106,342	6.50	3.65
2008	8.86	32,525	29,120	3,405	6,862	116,610	6.33	3.80
2009	9.02	33,652	30,662	2,990	7,426	127,026	6.27	3.93
2010	9.17	34,855	32,294	2,561	8,018	137,605	6.24	4.04
2015	10.14	41,765	42,783	(1,018)	12,375	192,964	6.84	4.25
2020	11.28	50,230	57,247	(7,017)	15,729	243,402	6.82	4.02
2025	12.58	59,387	75,467	(16,080)	17,191	266,383	6.72	3.35
2030	13.69	69,635	96,290	(26,655)	15,596	237,182	6.71	2.36
2040	14.98	95,657	144,781	(49,124)	–	–	–	–
2050	16.31	128,149	211,181	(83,032)	–	–	–	–
2060	17.84	168,017	302,838	(134,821)	–	–	–	–
2075	18.76	257,403	487,757	(230,354)	–	–	–	–

* All asset components are valued at market.

Under a much older population with economic stagnation scenario, the PayGo rate increases substantially over the long term, reaching 18.8% by 2075. This level is much higher than the steady-state contribution rate of 12.0%. The decrease in the size of the population leads to less contributors. The lower number of contributors together with low real wage growth causes total contributory earnings to fall significantly. Less contributors also eventually lead to a decrease in expenditures compared to the best-estimate. Although the expenditures decrease, the fall in total earnings is much greater which causes a substantial increase in the PayGo rate. As a result, the steady-state contribution rate is also much higher.

In this scenario, the steady-state rate rises above the legislated rate by 2.1 percentage points (12.0% less 9.9%). This deficit in the contribution rate is much greater than under the older population scenario. As a result, the net cash flow turns negative sooner by 2014 and the assets are depleted by 2039. The asset/expenditure ratio falls to zero by that time.

C. Alternative Pairing of Years for Determination of the Steady-State Contribution Rate

The following scenario analysis examines the impact on the steady-state contribution rate, average PayGo rate and asset/expenditure ratio of the Plan by altering the selection of years over which the steady-state rate is determined. The impact of the alternative determination periods is compared across the different scenarios examined in the previous sections. Three sets of determination periods are considered as shown in Tables 15, 16 and 17. The first set shows the financial impact of determining the

steady-state rate over 50-year periods, and the second and third sets show the impact for shorter periods of 35 and 25 years, respectively.

As described earlier, the steady-state contribution rate is defined under the current legislation as the lowest rate such that the asset/expenditure ratios in the tenth and sixtieth year following the third year of the most recent review period are the same. For the 21st CPP Actuarial Report, the 50-year period used to determine the steady-state rate corresponds to the years 2016 and 2066. As a reference, Table 15 provides the steady-state rates, average PayGo rates, and A/E ratios for the best-estimate and other scenarios for the period 2016 to 2066. The A/E ratio in the year 2075 based on the financial projection under the steady-state rate is also given for each scenario.

For each scenario, the average PayGo rate over the period used to determine the steady-state rate gives an indication of the pressure on the steady-state rate by the PayGo rate for the given period. Each steady-state A/E ratio shown results from the corresponding steady-state rate; that is, each ratio is the one that matches in the first and last years of the given period based on the corresponding rate. The A/E ratio in 2075 provides an indication of how the ratio evolves after the corresponding period.

Table 15 Determination of Steady State Contribution Rate over 50-Year Periods

	Years Used to Determine Steady-State Rate: 2016 and 2066[1] (50-year period)				Years Used to Determine Steady-State Rate: 2025 and 2075 (50-year period)			
Scenario	Steady -State Rate	Average PayGo Rate Over Period	Steady -State A/E Ratio[2]	A/E Ratio in 2075[3]	Steady -State Rate	Average PayGo Rate Over Period	Steady -State A/E Ratio[2]	A/E Ratio in 2075[3]
Best-Estimate	9.77%	10.92%	5.06	4.93	9.81%	11.21%	5.55	5.56
Younger Population	9.28%	10.48%	4.87	5.43	9.26%	10.55%	4.99	5.00
Older Population	10.31%	11.42%	5.36	4.55	10.46%	11.99%	6.40	6.40
Much Younger Population with Economic Growth	7.57%	7.88%	3.48	4.01	7.50%	7.79%	3.06	3.07
Much Older Population with Economic Stagnation	12.02%	14.97%	6.51	5.15	12.19%	16.27%	7.89	7.89

(1) 2016 and 2066 are the determination years for the steady-state contribution rate for the valuation of the CPP as at 31 December 2003 as given in the 21st CPP Actuarial Report.

(2) The steady-state asset/expenditure ratio (A/E) ratio results from the steady-state contribution rate over the corresponding determination period. Where the ratios at the start and end of the given period do not match exactly, the ratio presented pertains to the starting year.

(3) The A/E ratio in 2075 results from the financial projection of the Plan under the steady-state contribution rate.

Table 16 Determination of Steady State Contribution Rate over 35-Year Periods

	Years Used to Determine Steady-State Rate: 2016 and 2051 (35-year period)				Years Used to Determine Steady-State Rate: 2040 and 2075 (35-year period)			
Scenario	Steady -State Rate	Average PayGo Rate Over Period	Steady -State A/E Ratio[1]	A/E Ratio in 2075[2]	Steady -State Rate	Average PayGo Rate Over Period	Steady -State A/E Ratio[1]	A/E Ratio in 2075[2]
Best-Estimate	9.71%	10.69%	4.99	4.05	9.82%	11.34%	5.69	5.69
Younger Population	9.33%	10.48%	4.92	6.22	9.23%	10.44%	4.37	4.37
Older Population	10.10%	10.91%	5.12	2.01	10.55%	12.41%	7.48	7.48
Much Younger Population with Economic Growth	7.62%	7.93%	3.55	4.76	7.46%	7.70%	2.50	2.50
Much Older Population with Economic Stagnation	11.75%	13.85%	6.22	0.97	12.27%	17.25%	9.08	9.09

(1) The steady-state asset/expenditure ratio (A/E) ratio results from the steady-state contribution rate over the corresponding determination period. Where the ratios at the start and end of the given period do not match exactly, the ratio presented pertains to the starting year.

(2) The A/E ratio in 2075 is based on the financial projection of the Plan under the steady-state contribution rate.

Table 17 Determination of Steady State Contribution Rate over 25-Year Periods

	Years Used to Determine Steady-State Rate: 2016 and 2041 (25-year period)				Years Used to Determine Steady-State Rate: 2041 and 2066 (25-year period)			
Scenario	Steady -State Rate	Average PayGo Rate Over Period	Steady -State A/E Ratio[1]	A/E Ratio in 2075[2]	Steady -State Rate	Average PayGo Rate Over Period	Steady -State A/E Ratio[1]	A/E Ratio in 2075[2]
Best-Estimate	9.66%	10.50%	4.93	3.24	9.83%	11.34%	5.76	5.86
Younger Population	9.34%	10.40%	4.94	6.48	9.26%	10.56%	4.51	4.95
Older Population	9.95%	10.57%	4.95	0.14	10.53%	12.26%	7.46	7.30
Much Younger Population with Economic Growth	7.67%	7.98%	3.61	5.42	7.49%	7.77%	2.69	3.04
Much Older Population with Economic Stagnation	11.52%	13.10%	5.98	–	12.25%	16.85%	9.05	8.76

(1) The steady-state asset/expenditure ratio (A/E) ratio results from the steady-state contribution rate over the corresponding determination period. Where the ratios at the start and end of the given period do not match exactly, the ratio presented pertains to the starting year.

(2) The A/E ratio in 2075 is based on the financial projection of the Plan under the steady-state contribution rate.

From the above tables, the effect of different determination periods and projected scenarios on the steady-state rate, PayGo rate and asset/expenditure ratio can be seen as well as the relationship between the measures. For instance, the effect of the PayGo rate on the steady-state rate is observed. The tables show by a shift forward of a given determination period that if the PayGo rate is stable over time, then the steady-state rate will also tend to be stable. On the other hand, if the PayGo rate increases over time, then this will tend to increase the steady-state rate. In other words, an unstable PayGo rate leads to instability in the steady-state rate.

As the PayGo rate evolves differently over the projection period depending on the scenario, its average value over any determination period will vary according to when that period occurs, its duration, and the given scenario. For instance, for the best-estimate scenario shown in Table 15, the PayGo rate is relatively stable at a level of about 11% between the 50-year periods 2016-2066 and 2025-2075, and the steady-state rate likewise is stable at 9.8%. For the same two periods, however, the PayGo rate is less stable under a projected older population and even less so if economic stagnation is included. In each case, the steady-state rate increases by about 0.2 percentage points as the period shifts forward. The two 50-year periods in Table 15 both cover significant intervals of time over which the financial status of the Plan would reach somewhat of a plateau and stabilize. As such, the change in the average PayGo rate over a determination period for each scenario as the period shifts forward is less than the corresponding changes over a shorter determination period which in turn has a greater impact on the steady-state rate. For instance, in Table 17 under an older population with economic stagnation, the PayGo rate between the 25-year periods 2016-2041 and 2041-2066 changes significantly from about 13% to close to 17%, and this causes the steady-state rate to increase by over 0.7 percentage points.

Using a longer determination period to calculate the steady-state rate produces a more stable rate. Shorter determination periods, such as thirty-five or twenty-five years, lead to more volatility in the average PayGo rate over the determination period since the financial status of the Plan has less time to accommodate the projected demographic and economic environments of any given scenario. As a result, shorter determination periods lead to less stable steady-state rates over time. However, it may still be more appropriate to use a shorter period to determine the steady-state rate if one is more certain about the projected environments over the short term compared to the long term.

The tables show that the difference between the average PayGo rate over the determination period and the steady-state rate depends on the projected scenario. For instance, in Table 15 for the 50-year period 2016-2066, the difference between the PayGo and steady-state rates under a much younger population with economic growth is 0.3 percentage points. This is much less than the difference of close to three percentage points between the rates under a much older population with economic stagnation.

The asset/expenditure ratio that results from the steady-state rate tends to rise under older population scenarios and as economic conditions worsen since under such environments additional strain is placed on the net cash flows (contributions less expenditures) and thus the assets of the Plan. The much more reduced and eventually negative net cash flows cause the assets and asset/expenditure ratio to fall over time under the current legislated rate of 9.9%. Thus a steady-state rate higher than the legislated rate is required to raise the lower A/E ratio at the end of the determination period to match the higher ratio at the start of the period. In addition, the steady-state rate is effective nine years before the determination period begins and this further raises the A/E ratio. The converse to the above also holds, that is, the A/E ratio resulting from the steady-state rate tends to fall under younger population scenarios and as economic conditions improve.

A comparison of the three tables above also reveals that using a longer determination period to calculate the steady-state rate results in less change in the A/E ratio following the period. This may be observed from the value of the A/E ratio in the year 2075 compared to the A/E ratio resulting from the steady-state rate. For instance, shortening the period starting in 2016 from 50 to 35 and then 25 years (i.e. periods 2016-2066, 2016-2051, 2016-2041) causes the A/E ratio to decrease by 0.8, 3.1, and 4.8 respectively under the older population scenario. Determination periods ending closer to the year 2075 also result in less change in the A/E ratio.

It should be noted that once a target funding level is reached, it becomes less relevant to wait ten years after the end of the most recent triennial review to calculate the steady-state rate. The ten-year delay was originally put in place as part of the 1997 reform as a means for the Plan to transition from a PayGo basis to a state of fuller funding while minimizing the resulting volatility in doing so. Thus, upon reaching a target level of fuller funding, such a delay becomes less relevant and may be shortened. For instance, the delay could be shortened to three years over which the legislated rate would still apply. In this way, any volatility that would result from a new steady-state rate would be lessened as there would still be a slight delay before the new steady-state rate and possibly a new legislated rate would apply.

In summary, the above analysis shows that the current steady-state funding methodology as set out in the Regulations of the Plan is both robust and appropriate, and as such, is in accordance with the Guiding Principles to ensure the Plan's sustainability as agreed upon by the Plan's stakeholders in 1996. In particular, the current steady-state funding methodology of the Plan is in agreement with Guiding Principle No. 4. which states that the "CPP must be affordable and sustainable for future generations" (see Appendix A).

VII. Advantages and Disadvantages of the Steady-State Funding Methodology

The 1997 reform of the CPP put the Plan on solid financial footing for the future primarily by changing the way the Plan was financed, from PayGo financing with a small reserve to fuller funding in the form of the steady-state methodology. Although there are strong advantages to steady-state funding, disadvantages nonetheless are present as would be the case with any type of funding. This section provides a more global overview of the different aspects of steady-state funding than the detailed analysis provided so far.

Advantages of Steady-State Funding

First and foremost, the implementation of steady-state funding has helped to ensure the long-term financial sustainability of the Plan for current and future generations. The Plan has been preserved and thus a key pillar of the Canadian retirement income system will remain in place. As such, retirement income security will be maintained for millions of Canadians.

The transition to steady-state funding resulted in increased fairness across generations; that is, intergenerational equity has improved since current and future generations of contributors will face more stable contribution rates than under PayGo financing under which the rate was projected to increase significantly over time. More stable contribution rates will lead as well to a stabilization in the internal rate of return realized by future beneficiaries. Moreover, the progressive contribution limits and benefit formula results in a redistribution of earnings across different earnings levels.

Steady-state funding is robust in that the contribution rate does not significantly change from one actuarial valuation to the next. Once a target funding level is reached in the future, the ten-year post-triennial review waiting period applied before the rate is calculated as well as the determination period could both be shortened if the projected demographic and economic environments are stable.

Disadvantages of Steady-State Funding

In the early years of the Plan, individuals contributed for a relatively short period of time before retiring and collecting benefits. Further, the demographic and economic environments of the time allowed for the Plan to be financed at a much lower contribution rate on a PayGo basis. As the Plan has been maturing with time, workers have been contributing for longer periods before transitioning to retirement and collecting pensions. Demographic and economic conditions also changed over time which caused the contribution rate required to maintain the Plan on a PayGo basis to increase. The legislated contribution rate was substantially increased as part of the 1997 reform. Collectively, current generations of workers are paying more in relation to their benefits compared to older generations of workers. In other words, younger generations have experienced a lower internal rate of return although it has stabilized as a result of the changes.

Lastly, although the steady-state contribution rate is fairly stable from valuation to valuation, the rate is still dependent on many factors and thus is subject to change. However, given the interrelationships that exist between factors and thus the possibility for

offsetting effects, it is not expected that such short-term fluctuations will be large given reasonable best-estimate assumptions for the Plan. Nonetheless, demographic and economic changes over time will affect the PayGo rate of the Plan, which in turn will cause the steady-state rate to change.

VIII. Conclusion

Different countries have implemented social security schemes in order to provide a degree of retirement income security for their citizens. These schemes vary greatly in terms of their administration and regulation, contribution levels, benefit provisions, type and extent of funding, as well as other aspects. As demographic and economic conditions have changed, so too has been the need to review and change these schemes in order to maintain them for the long term.

The ways in which social security schemes are funded in different countries are continually reviewed for their level of appropriateness given the respective benefits and risks involved and the changing demographic and economic environments. Three basic ways of funding such schemes are pay-as-you-go, full, and partial funding. PayGo financing is more appropriate in an environment of high real total wage growth and low real investment returns, while full funding is more appropriate in an environment of low wage growth and high investment returns. Partial funding lies between these two approaches and applies well in an environment of declining total wage growth and rising investment returns. It is recognized that to be considered beneficial any level of prefunding must lead to an increase in national saving and ultimately in economic output to supply the goods and services consumed by future retirees.

Major changes in 1997 led to the change in financing of the Canada Pension Plan from a PayGo basis to a form of partial funding called steady-state funding. The 1997 reform, and particularly steady-state funding, resulted in the Plan's financial sustainability being restored for current and future generations. The financial status of the Plan is expected to continue improving over time as the assets, asset/expenditure ratio and funding ratio are all projected to increase. The steady-state contribution rate results in an asset/expenditure ratio and funding ratio that are both relatively stable over time. The excess of the legislated rate over the steady-state rate that has existed since 2003 has further improved the Plan's financial status. This margin also provides room for the Plan to absorb some of the impact of adverse experience that may arise in the future. As it is expected that real investment returns will continue to exceed real growth in total earnings and that the legislated rate will be maintained at a level higher than the steady-state rate, the funding level of the Plan will continue to rise.

The focus of this study has been an examination of the current steady-state funding methodology of the CPP for its continued appropriateness since its implementation in 1998. This examination involved testing the robustness of the methodology by way of scenario analysis. The scenarios included alternative demographic and economic environments than those projected under the best-estimate assumptions of the 21st CPP Actuarial Report. All the scenarios were tested using alternative pairings of years for the determination of the steady-state rate. The scenario analysis showed that the current steady-state funding methodology is robust and appropriate for the purpose of contributing to the long-term financial sustainability of the Plan, assuming that future demographic and economic conditions do not vary drastically from those projected, the CPP Fund continues to earn a reasonable rate of return and the PayGo rate does not exceed the steady-state rate to a large degree. These conditions are considered to be reasonable over the long term as indicated by recent actuarial reports on the Plan.

In summary, this study has shown that steady-state funding of the Plan is a form of optimal funding of the Plan. Although the funding methodology could always be modified or reshaped altogether, the objective of prefunding the Plan should remain paramount. By stabilizing the asset/expenditure and funding ratios over time, the steady-state methodology helps to ensure that the CPP is affordable and sustainable for current and future generations of Canadians.

IX. Appendices

A. Principles to Guide Federal-Provincial Decisions on the Canada Pension Plan

Following extensive consultations across Canada on the Canada Pension Plan, governments agreed that they must put to rest the worries that Canadians have that their CPP pensions will not be there for them when they retire in the future. They therefore agreed that they must solve the problems facing the CPP quickly, and that they will be guided by the following principles in doing so:

1. The CPP is a key pillar of Canada's retirement income system that is worth saving.
2. The CPP is an earnings-related program. Its fundamental role is to help replace earnings upon retirements or disability, or the death of a spouse – not to redistribute income. The income redistribution role is the responsibility of the income tax system, the Old Age Security/Guaranteed Income Supplement/Seniors Benefit, and other income-tested programs paid from general tax revenues.
3. The solutions to the CPP's problems must be fair across generations and between men and women.
4. The CPP must be affordable and sustainable for future generations. This requires fuller funding and a contribution rate no higher than the already legislated future rate of 10.1 per cent. In deciding how quickly to move to this rate, governments must take economic and fiscal impacts into account.
5. Governments must tighten administration as the first step towards controlling costs.
6. Disability and survivor benefits are important features of the CPP. However, they must be designed and administered in a way that does not jeopardize the security of retirement pensions.
7. Any further benefit improvements must be fully funded.
8. CPP funds must be invested in the best interests of plan members, and maintain a proper balance between returns and investment risk. Governance structures must be created to ensure sound fund management.
9. Governments must monitor changing economic, demographic, and other circumstances which can affect the CPP, and act to respond to these changing conditions. Annually, Ministers of Finance should provide Canadians with the appropriate information so they can judge for themselves that the integrity and security of the CPP is being protected.

B. Social Security Schemes in Other Countries

This section provides a brief description of social security schemes in several countries around the world, other than Canada. The history, provisions and financing of the Canada Pension Plan are discussed in sections IV and V.

1. United States

The Old-Age, Survivors, and Disability Insurance Program (OASDI) is a contributory, defined benefit plan, which began in 1935. Coverage is mandatory for workers who are gainfully occupied, including self-employed individuals, with the exception of certain classes of workers. Plan members and employers contribute 6.2% each of earnings up to a set maximum, and self-employed persons contribute the combined 12.4%. The upper earnings limit upon which contributions are made and benefits calculated is adjusted each year in line with average wage growth. In 2006, the maximum covered earnings are $94,200.

The OASDI Program provides retirement, survivor and disability benefits, as well as means-tested supplemental income retirement and disability benefits. Benefits are determined based on a contributor's primary insurance amount, which is determined from the contributor's covered earnings, indexed for wage growth. Benefits are adjusted annually for changes in the cost of living. Early and postponed retirement benefits are payable, subject to adjustments based on the normal retirement age. The normal retirement age has been scheduled to increase from 65 to 67 for those born between 1938 and 1960. Beneficiaries below the normal retirement age are subject to a retirement earnings test whereby a portion of their benefits is withheld if their retirement earnings exceed a certain level.

Assets of the OASDI Program are held in two separate Trust funds, namely the Old-Age and Survivors Insurance (OASI) Trust Fund and the Disability Insurance (DI) Trust Fund, each of which hold special issue U.S. Treasury securities. Income to the Trust Funds individually and in total is projected to cover expenditures over the next ten years according to the 2006 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds. The retirement of the baby boomers is expected to cause expenditures to rapidly increase between 2010 and 2030. Thereafter, the general aging of the population will cause expenditures to grow, but at a slower rate. Expenditures are projected to exceed contributions starting in 2017. This shortfall will then be met each year and beyond by redemptions of the special issue obligations of the Treasury. It is projected that the DI fund will be exhausted in 2025 and the OASI fund in 2042. In order to maintain the solvency of the Program until 2080, the contribution rate would need to be increased by 2.02 percentage points, the benefits reduced by 13.3%, significant general revenues transferred to the Trust funds, or some combination of these actions. Such changes would be required since the Program is largely financed on a PayGo basis.

2. United Kingdom

In the United Kingdom, social insurance and assistance are provided through old age, disability, survivor and other benefits, which came into effect at different times

between 1908 and 1925. Two basic plans provide coverage, namely the Basic State Pension, which provides a flat rate retirement benefit, and the earnings-related Additional State Pension, also known as the State Second Pension and formerly the State Earnings-Related Pension Scheme. Male employed persons aged 16 to 65 and female employed persons aged 16 to 60 with weekly earnings above a set minimum are covered by the plans. Self-employed persons subject to the same sex-distinct age ranges with annual income above a certain minimum are covered for all benefits except the State Second Pension as well as other specific benefits. In addition, special rules apply to voluntary contributors. Contributions to the scheme, or National Insurance contributions, are paid by employees at the rate of 11% of weekly earnings between a lower and upper limit plus an additional 1% of earnings over a second upper limit. Different rates and limits apply to self-employed persons and other groups. Employers contribute 12.8% of weekly earnings to employees above a minimum. These rates are applicable for the 2006-07 tax year.

A voluntary carve-out option exists whereby employers and employees may contract out of the State Second Pension scheme into a private pension. Under this option, a portion of the contributions is redirected to a private account and in exchange, the worker's social security benefit is reduced upon retirement. The portion is calculated by a payment rate, which is re-evaluated on a regular basis by the Government Actuary's Department, taking into account life expectancies and interest rates. In exchange for contracting out, annual payments by the government may also be paid to the schemes. The payments and reduction in National Insurance contributions together are called contracted-out rebates. Workers can contract out either to defined benefit or defined contribution schemes. Workers are also given the option to contract out and back in as often as desired, but either option must span across complete tax years. If the contracting out arrangement is an occupational scheme, rebates apply for both the employer and employee. Annuitization of the accumulated balances is available to workers upon retirement by way of a contract with an insurance company. Workers are not required to annuitize upon retirement but instead may choose to annuitize at a later time or not to annuitize at all. In the latter case, an income would be drawn directly from the pension fund and the remaining amount continues stays invested for future income. In the case where annuities are purchased, they must be indexed to prices up to 3% per year. Annual price increases in excess of 3% are covered by the U.K. Government.

The state pension age for men is currently 65 and for women is set to rise from 60 to 65 over the period 2010 to 2020. National Insurance contributions stop being paid once the state pension age is reached, and an individual may continue working while receiving a pension. There are no early retirement benefit provisions. Retirement benefit uptake may be delayed subject to an upward adjustment. The number of years required to be eligible for a full pension is reduced if the worker had been a caregiver for a child, or elderly or disabled relative. Those retirees aged 80 or older who receive little or no State Pension are eligible for an additional non-contributory pension, subject to residency requirements. An additional benefit called the pension credit may also be payable. The pension credit is comprised of the guarantee and savings credits. Guarantee credits are means-tested benefits available to persons aged 60 or over who reside in Great Britain. Savings credits may also be payable from age 65 for those with

savings or other non-state pensions. Retirement, survivor and disability benefits are adjusted annually in line with price increases.

Assets of the National Insurance Scheme are held in the National Insurance Fund. The Scheme is financed on a pay-as-you-go basis so that contributions are set to cover current expenditures and to maintain a moderate working balance. The Fund is invested in Government securities. Over time, the Fund's balance has increased owing to differences between income and outgo. Expenditures from the Fund are expected to rise significantly in the future due to the aging of the population, the increase in entitlements to the State Second Pension, the expected decrease in amounts contracted out, and the growing entitlement of women to pensions. This will cause the pay-as-you-go rate to increase, assuming earnings limits for contributions and benefit rates (other than Additional State Pension benefits in-pay which are assumed to increase with price inflation) increase in line with average earnings. Moreover, additional funds would be required to sustain the Fund starting in the tax year 2020-21, and significant transfers would be required thereafter.

The United Kingdom Government has recently released a White Paper describing proposals for pension change. These changes include promoting personal saving by way of a new National Pension Savings Scheme (NPSS) of personal accounts starting in 2012, whereby employees will be automatically enrolled in the NPSS, if not already enrolled in another adequate scheme, with the option to opt out. Employees would contribute 4% of after-tax earnings within a range and employers would contribute 3% of earnings within the same range. In addition, a further 1% would be contributed by the State in the form of tax relief. Employers would also be able to opt out of the NPSS if they offered an alternative scheme with contributions at or above the NPSS level. For such alternative schemes, employers would be required to automatically enrol their employees. The administration and investment of the funds of the NPSS would be outsourced to private contractors. The Basic State Pension would be indexed to average earnings growth, the State Second Pension would be reformed as a flat-rate top-up, and the number of years required to qualify for the Basic State Pension would be reduced to 30. In addition, contracting out of the State Second Pension into a defined contribution scheme would be abolished. Further, the state pension age is set to increase for both men and women in line with increases in average life expectancy, from 65 to 66 between 2024 and 2025, from 66 to 67 between 2034 and 2035, and lastly from 67 to 68 between 2044 and 2045.

The introduction of the proposed pension changes would result in a mixed funding approach to social security with PayGo financing for the current National Insurance Scheme and full funding for the proposed National Pension Savings Scheme.

3. Chile

In 1981, the defined benefit social insurance system in Chile was replaced with defined contribution private mandatory accounts. Participants in the social insurance scheme were given the choice of switching to the new system. Starting in 1983, all new participants to the labour force were required to join the mandatory account scheme. Over time, the social insurance scheme will phase out as the number of beneficiaries

decreases. Each scheme provides retirement, survivor and disability benefits. Those employees still under the old system are required to pay contributions on earnings between and upper and lower limit, where the contribution rate depends on the nature of the job. Employees under the new scheme are required to contribute 10% of their wages between a lower and upper limit to one of a choice of private pension management companies. As at the end of 2005, there were six of these companies, or "AFP"s (Administradoras de Fondos de Pensiones). In addition to the base contribution, employees are also required to pay contributions to the AFPs toward administrative expenses, and survivor and disability insurance. Employers are not required to contribute to the accounts, except for those employees working under arduous conditions. For self-employed individuals, contributing to the accounts is voluntary.

Each AFP offers several funds to employees to choose from, where each fund carries a different level of risk. Employees who do not specify a fund are assigned to a default fund based on their age and sex. The age and sex of an employee also determine which funds may be chosen, with riskier funds becoming unavailable at higher ages. AFPs are subject to government rules limiting the amount of each fund which may be invested in a given asset class. Asset classes include government securities, financial institutions, stocks, corporate bonds, and others. Government rules also specify upper and lower limits for the rates of return of each fund. AFPs are expected to maintain reserves for each fund in the case its respective rate of return falls below the lower limit. In such a case, the fund-designated reserves are to be used to make up the shortfall. If the reserves are insufficient, then the shortfall must be covered by the AFP's corporate assets. If these are still insufficient, then the government covers the shortfall, dissolves the AFP and distributes its funds to other AFPs. Investment income from returns on a fund above the upper limit must be placed in the fund's reserves to offset future periods of returns below the lower limit.

Those employees who switched from the old to new system were paid a one-time salary increase by their employers and were given "recognition bonds" from the government to recognize their contributions to the old system. The value of these bonds is added to an individual's fund balance at the time of retirement. The normal retirement age is 65 for men and 60 for women. Early retirement is permitted, subject to there being sufficient accumulated retirement assets. Early retirement pensions are subject to a reduction. After retiring from the system, workers may continue to work while receiving their benefits without penalty. Upon retirement, an employee's pension fund may or part thereof may be converted to a life annuity, used to take programmed withdrawals, or used to take some combination of an annuity and programmed withdrawals. Those employees who contributed to mandatory accounts for at least twenty years are eligible for a government subsidized guaranteed minimum pension if all assets at retirement yield a benefit less than the minimum pension. The guaranteed minimum pension is increased for inflation and periodically for wage increases. Those employees who do not qualify for the minimum pension may be eligible to receive an "assistance pension"; however, the amount is small and there is a quota on the number of people who may receive it.

The social insurance scheme was pay-as-you-go financed. Although the new system is described as being fully funded, it is in fact partially funded as the government provides subsidies to the system.

4. Sweden

In 1999, a new social insurance and accounts system was established in Sweden. The old defined benefit scheme was converted to a new system that included notional pay-as-you-go and mandatory individual "premium pension" defined contribution accounts. There is a gradual transition from the old to new system for persons born between 1938 and 1953. Persons born in 1937 or earlier remain with the old system, while those born in 1954 or later are entirely within the new system. Each system provides retirement, survivor and disability benefits. Each system has an earnings-related pension as well as a supplemental guarantee pension funded from general tax revenues. The new system has the added component of premium pension accounts. Under both old and new systems, coverage under the earnings-related system is mandatory. Under the new system, coverage under the individual accounts is mandatory for all employed and self-employed persons with earnings above a set minimum. All residents are covered by the guarantee pension.

Both old and new systems have the same sources of funds; employees contribute 7% of assessable income up to a set maximum for old-age insurance, and employers contribute 11.91% of payroll for old-age insurance and survivor pensions. Self-employed persons contribute 18.91% of assessable income up to the maximum for old-age insurance and survivor pensions. The total cost of the guarantee pension and permanent disability benefits under the new system is covered by the government. The combined employee-employer contribution rate allocated to the accounts is 18.5% with a split of 16% to the notional account and 2.5% to the premium pension account. Contributions to the accounts are paid on earnings above a minimum level. Coverage for persons under the accounts starts at age 16.

The notional and premium pension accounts increase in value with contributions and other transfers, returns on the accounts and inheritance gains. For the notional accounts, the return is based on the growth in the average wage rate, whereas the return earned on the individual pension premium accounts results from the individual funds chosen. Inheritance gains result from distributions of accounts of deceased persons to accounts of survivors. The individual accounts are self-directed and contributors are given the choice of which funds to invest in from a large selection of fund companies. Fund types include national and international equities, balanced assets, interest-earning securities, and life-cycle securities. A default fund is available for individuals who do not wish to invest actively.

Contributors may start receiving full or partial benefits from their notional and/or individual accounts as early as age 61 and with no upper age limit. Further, members may both receive benefits and continue working with their ongoing contributions used to improve their account values. Upon permanent retirement, the final account value is used to recalculate the benefit. Mandatory annuitization applies to the individual accounts, and beneficiaries may elect to receive fixed or variable income annuities.

The annuities are determined according to standard insurance practices. Benefits from the notional accounts are also paid as annuities; however, the annuity factors are based on a cohort in the year the individual turns 65, regardless of when the individual actually starts his/her benefit. The notional account annuities are indexed to inflation with an annual adjustment made for divergence between the trend in average wage growth and expected growth or "norm" of 1.6% used in calculating the original benefit. The guarantee benefit is indexed annually to inflation.

The notional accounts system is a pay-as-you-go scheme; however, there exists a reserve fund available to help offset the cost of the transition cohorts who are still partially under the old system. The notional accounts system also includes a balance index, which is based on the present values of assets and liabilities and is used to adjust the indexation of benefits in pay as well as the returns credited to the notional accounts in order to restore the balance between the assets and liabilities.

5. Australia

The retirement income system in Australia consists of social security, mandatory superannuation, and other occupational plans and personal savings. There is no public earnings-related retirement income program. Social security in Australia provides retirement benefits in the form of the Age Pension, which was introduced in 1908. The Age Pension is a means-tested flat rate benefit subject to both an income and asset test. There is also a residency requirement to receive the pension. In addition to providing the retirement benefit, social security also provides disability and survivor benefits as well as different types of allowances and assistance. Social security covers all residents and is funded from general revenues.

The Age Pension is payable to men from age 65. For women the minimum age at which the Age Pension is payable has been set to increase from age 60 in 1995 to age 65 by 2014. As at January 2007, the pension is payable to women from age 63. A pension bonus is paid to those who delay retirement up to five years, subject to certain conditions. The pension is indexed to inflation and is adjusted periodically with ad hoc increases to ensure that the single rate pension equals at least 25% of pretax male average earnings.

The Age Pension for both single and married rates is reduced by 40 cents for each dollar of income above a threshold or "free area", which is indexed annually to inflation. In addition to this income test, there is an asset test which reduces the pension by $1.50 per week for every $1,000 above certain thresholds. The test which results in the lower pension being paid applies. The Age Pension is also taxed; however, a pensioner rebate fully exempts full-rate pensions and partially exempts part-rate pensions.

The mandatory superannuation program, called the Superannuation Guarantee (SG), was introduced in 1992. Under this program, employers are required to contribute 9% of covered earnings of employees between the ages of 18 and 69. For low-wage earners, the contribution requirement of the employer is reduced and government subsidies are provided. Employers who do not comply with the program are subject to

a Superannuation Guarantee Charge. Employers can avoid the charge by providing a defined benefit plan as a substitute; however, in that case an actuarial benefit certificate is required which states that the value of plan members' benefits is equal to or greater than what it would have been under the SG program. Employer contributions are tax deductible subject to certain limits and the age of the employee. Employees, though not required to contribute, are given the option to make voluntary contributions and encouraged to do so. Self-employed persons are not required to contribute to the scheme, but may make voluntary contributions with certain applicable tax deductions.

Superannuation contributions are made to individual accounts in superannuation funds chosen by employees and invested on their behalf. Retirement Savings Accounts are also available by financial institutions as a low cost option for small contributions. Employees have many options from the large number of funds available. Employees who do not choose a fund have their contributions placed with a default fund chosen by the employer. Once in a fund, the assets are fully vested to the employee and remain locked in until eligible retirement or "preservation" age is reached.

The superannuation industry is largely supervised by the Australian Prudential Regulation Authority (APRA). Workers must choose among funds regulated by the APRA. The funds are overseen by boards of trustees who are responsible for the management and investment of the funds. Other than a few restrictions, there are no requirements placed upon the boards with respect to the assets or rates of return. This has led to many funds being invested in a broad mix of securities. Trustees typically delegate many tasks to service providers such as fund administrators, investment managers and other professionals. There are five types of funds: public sector, corporate, retail, industry, and small self-managed funds.

Contributions to superannuation funds, investment earnings thereon and the retirement benefits that are eventually withdrawn are all taxed at concessional rates. Funds are also subject to administrative and investment fees, but up to a limit for small amount accounts. Accounts with amounts too small to cover fees are held in special holding accounts. Assets that accrue in superannuation funds may be taken as retirement benefits either in the form of a lump sum or an income stream upon a person reaching preservation age. This age is currently 55 and is set to increase to age 60 by the year 2025. Retirement benefits payable from superannuation funds in the form of income streams are not required to be of a specific type. In general, they are either superannuation pensions paid by the funds, traditional annuities offered by life insurance companies, or allocated pensions and annuities, known as phased withdrawals, offered by financial institutions. Annuities offered by life insurance companies may be fixed or indexed, and phased withdrawals offered by financial institutions are subject to minimum and maximum amounts per year.

The current system has shifted the responsibility of retirement income security more onto individuals and away from the government as the funding approach has shifted in part from a PayGo basis to a fuller funded one. As such, the public benefit programs are financially sustainable. However, benefit adequacy in retirement is an issue given the perceived level of financial illiteracy in the population. To better educate the public about financial matters, the government created the Consumer and Financial Literacy

Taskforce in 2004 which was charged with developing a national plan to improve levels of financial literacy. The key recommendation of the Taskforce was the establishment of a national financial literacy body, which resulted in the creation of the Financial Literacy Foundation in 2005.

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D. Acknowledgements

The following people assisted in the preparation of this study:

Kimberley Burt
Monique Denner
Patrick Dontigny, A.S.A.
Sari Harrel, A.S.A.
Jean-Claude Ménard, F.S.A., F.C.I.A.
Michel Millette, F.S.A., F.C.I.A.
Michel Montambeault, F.S.A., F.C.I.A.